DIAGNOSTIC AND ATTAINMENT TESTING

INCLUDING A MANUAL OF TESTS, THEIR NATURE, USE, RECORDING AND INTERPRETATION

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PRINTED AND PUBLISHED IN GREAT BRITAIN BY
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PREFACE

THIS book on diagnostic and attainment testing has been compiled in response to requests, firstly for further guidance on the use and interpretation of tests in educational practice, and secondly, that our various tests should be made available in a single volume.

In the earlier sections we have set out some of the main principles to be observed in the use of tests if their employment in educational practice is to be fully effective for both assessment of scholastic levels and diagnosis of difficulties. The choice of tests, the administration and interpretation of them and the recording of results are matters which all students of educational psychology should consider carefully. Accordingly we have set out in some detail the diagnostic value of various tests for educational guidance in verbal and arithmetical studies, and their assessive value for indicating changes in school achievements by entries made in cumulative record cards. But tests have their limitations as well as their values, and one should know what points to observe in order to avoid pitfalls of over-evaluation or incorrect interpretation. Moreover, test performances represent complex resultants for the adequate interpretation of which one needs additional information, particularly on the qualitative side. One should not place too much reliance on an isolated test finding.

But the value of tests also depends upon the form in which they can be used and presented to testees—this influences the results obtained. Educational psychologists working in schools and clinics, students in colleges, and teachers who use tests in the daily routine of their work or training have expressed the need for having the various tests in a convenient and concise form so as to make their application and interpretation as effective and as time saving as possible.

Consequently we have embodied all the tests in this book, observing closely the same format and setting out as is found when the tests are reprinted in separate sheets or booklets. The instructions for the tests, which should be mastered with absolute accuracy, are not here reproduced because constant users of the tests soon commit these to memory in order to provide a natural approach to the testing situation. But we have given, with the different groups of tests, explanatory notes on fundamental directions, and on the significance of the tests for educational purposes. And we have reproduced, often in an extended form to facilitate calculation of the attainment ages, the various tables of norms for each test. From the interpolated norms it is possible to read off directly scores in terms of equivalent subject ages.

The authors hope that the setting out of tests in this form will facilitate their use in making school record card entries, in the examination of children at Child Guidance Clinics or Educational Centres and in the diagnosis of backwardness.

Certain new tests and median sample compositions are included.

Special care has been taken to provide full details of the contents by use of sub-headings and by the addition of page references for certain sections as they occur in the book. This procedure it was felt would provide the most effective way of indexing the material.

We should like to thank those teachers and students who from time to time have given help with testing.

We are grateful to our colleague Dr W. D. Wall for reading the manuscript, and for his helpful suggestions. And we are heavily indebted to Mr S. Stewart, Educational Editor, Oliver and Boyd, for his help and advice. He has in many ways suggested improvements, and surmounted difficulties of layout and production.

NOTE ON THE NEW NORMS

New norms for *Silent Reading Tests A* and *B* are given on pages 49 and 59. In both cases these are slightly lower than the original norms. Two reasons partly explain this :

(*a*) All recent research and surveys indicate slightly lower post war reading standards—this may be a combined result of early wartime upsets when skills were being acquired, and of present day very large classes. It is noticeable particularly in some secondary modern school populations.

(*b*) In the original standardisation only seven and eight year olds in the junior school were included, and hence the new norms, which have been derived from testing all seven year olds in junior and infant classes or departments as well, are somewhat lower. These new results are the basis on which the new table of scores and equivalent reading ages have been based.

It should be noted that the reading ages derived from scores under 4 in *Silent Reading Test A* cannot have absolute accuracy because at the age period 6 to 7½ years there are uneven and very varied changes in reading growth and reading levels.

Furthermore as Test A is designed primarily for the 7-12 reading age range, one would advocate that bright pupils with very high scores should be tested on *Silent Reading Test B*.

A fuller presentation has been given to the norms of *Diagnostic English Test* (pages 147-148) than that appearing in the *Handbook of Instructions* to that test. Similarly the norms of *Diagnostic Arithmetic Test* (pages 126-131) are expanded from those appearing in *Diagnosis of Individual Difficulties in Arithmetic*. This is to remove any ambiguity which might result from failure to appreciate that the score given for each age in the original tables is for the mid-point of that year, and not the beginning. The norms are unchanged.

F. E. S.
F. J. S.

BIRMINGHAM, 1950.

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I. TESTING IN EDUCATIONAL PRACTICE

RESEARCH results and classroom usage have demonstrated that properly standardised tests of ability and attainment can be of great value to those engaged in education. The use of objective measures comparable from area to area, school to school, and pupil to pupil may do much to assist administrators to make their planning more scientific, and teachers to make their instruction more effective. Results from objective tests should help to individualise teaching by giving a correct evaluation of each pupil's mental powers and scholastic levels, and by focussing attention on his obvious capacity and needs. Furthermore, information obtained from standardised tests should contribute towards replacing unsubstantiated opinions by considered findings and, in some fields, should contribute towards eliminating the harmful effects of useless tradition.

A testing programme for use in an educational area, a school, a Child Guidance or Educational Clinic must be planned for a particular purpose and to suit the needs of particular groups of children. The pupils, and not the educational institution or the system, should be the main consideration in framing such a programme. There is always the danger that extensive testing, particularly where results are not used and interpreted effectively, can lead to rigidity and even sterility in teaching, because measurements tend to assume some value in themselves when in fact they have only relative value in the light of the action which follows. On the other hand teaching without use of carefully planned testing may result in a good deal of misplaced effort on the part of teachers, and failure and frustration on the part of pupils. Not a little of this loss of achievement and satisfaction on the part of both teachers and taught could be avoided if objective measures of appraisal, diagnosis and checking were used. A knowledge of *standardised tests* of mental ability and attainment should be part of an adequately trained teacher's classroom equipment. Before passing on to an assessment of standardised tests and teachers' tests (p. 7), it has been felt essential to make a brief examination of some methods of classifying and interpreting test scores.

CHARACTERISTICS OF THE DISTRIBUTION OF TEST SCORES

The scores from a comparatively large group of pupils in respect to any given ability or attainment conform to the normal curve of distribution. For example, if we measure the general intelligence, by means of an intelligence test, of a large representative group of pupils between the ages of 7 and 11, calculate the mental ages and intelligence quotients from the scores, and then plot these measures in the form of a frequency polygon, the resulting distribution curve is bell shaped and *similar*[1] to a normal frequency. Fig. 1 shows the distribution of I.Q.'s from 1709 pupils between the ages of 7 and 11.

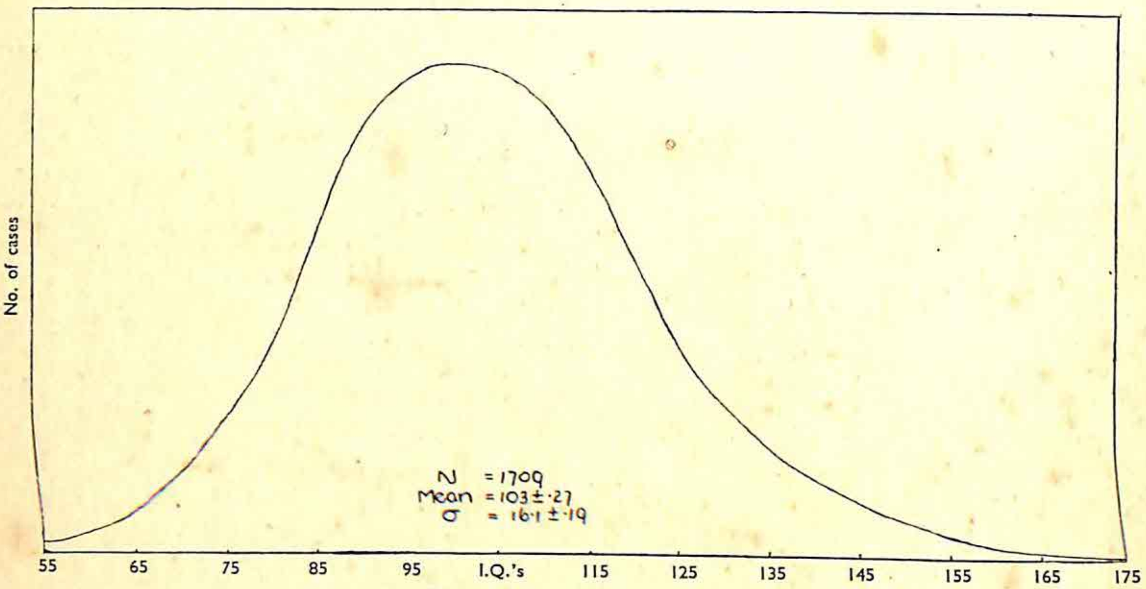


FIG. 1.—Distribution of I.Q.'s from 1709 pupils.

It will be noted that the curve is not absolutely smooth because in practice we never take enough cases for the distribution to give a perfect normal distribution curve.

Again in school attainments, if a large number of pupils are tested and their scores are plotted as a frequency polygon the distribution curve would be similar to that in Fig. 2.

It will be seen in both figures that a large number of testees get scores (I.Q.'s or reading scores) round about the average or mean, slightly less get scores just above or just below the mean and then the number of pupils getting scores appreciably different from the mean decreases gradually until there are very few extreme scores, that is extremely low or extremely high.

But let us examine the results when the tests on which the distribution in Figs. 1 and 2 are based, and which are intended for a normal range of pupils—dull, average and bright—of a specified age range, are given to two smaller, selected groups of pupils. In one case the tests were set to pupils, ages 8 to 11, many of whom were dull and backward, that is, their I.Q.'s and their reading

[1] Actually research reveals that I.Q.'s do not conform absolutely to the normal curve of distribution. There is a very slight tendency for there to be more I.Q.'s round the 90 mark and slightly less than normal round the 110-120 mark, but these variations are so small as to be unimportant for practical purposes. See the report of the Scottish Committee for Educational Research "The Intelligence of a Representative Group of Scottish Children," M. A. Macmeeken (University of London Press). See also Sir Cyril Burt's observations on the distribution of intelligence in *Mental and Scholastic Tests* and *The Backward Child*.

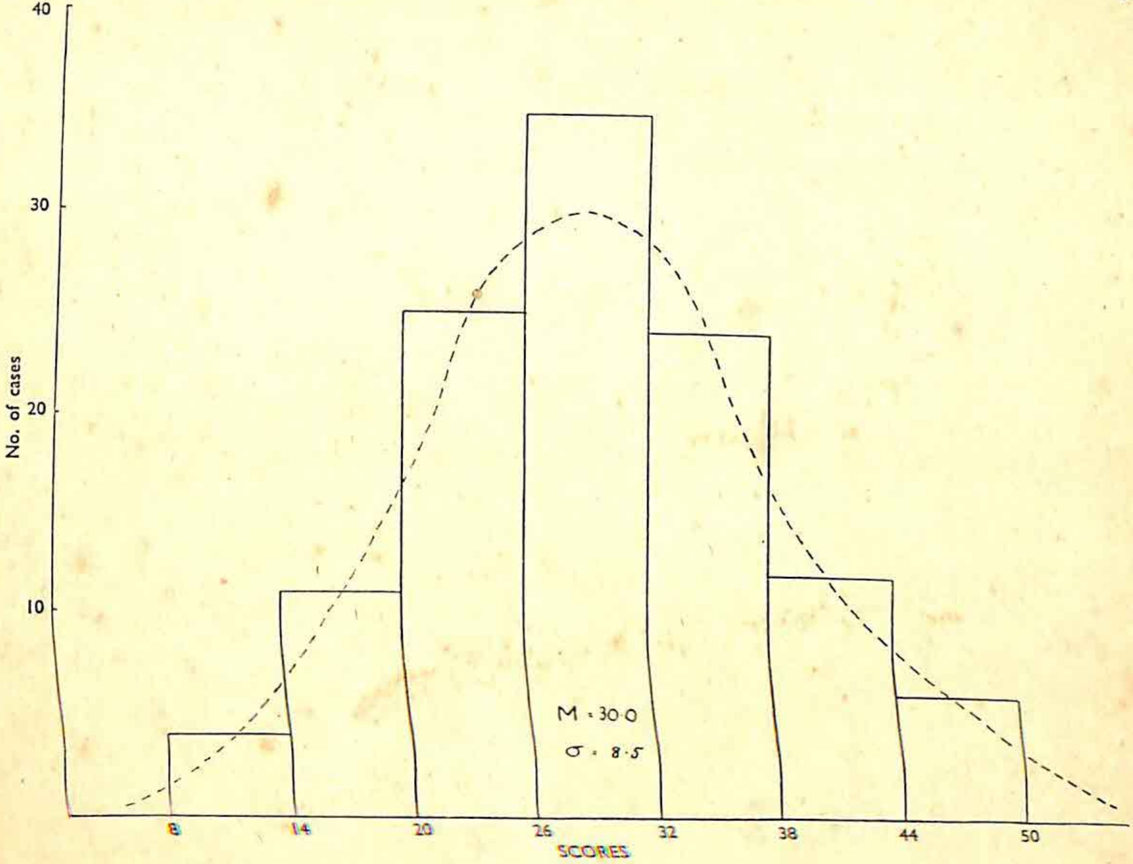


FIG. 2.—Silent Reading Scores of 1865 pupils aged 7+ to 13+.

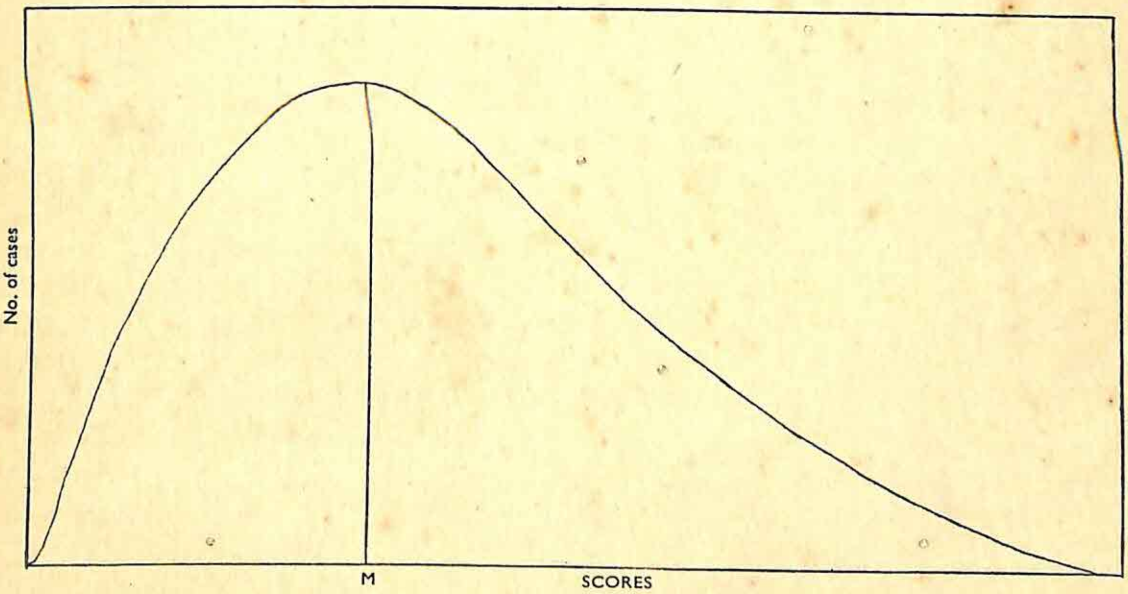


FIG. 3.—Skew curve of a positive kind, that is, scores are massed at the lower end and hence there is a skewing towards the upper or positive end.

scores were much below what is normal for pupils of corresponding chronological ages. There were in this sample some pupils (27 per cent.) who, though backward in school work, were nevertheless of average or above average intelligence, and in addition there were a few pupils who could read fairly well. The resulting distribution curves for both the intelligence test result (in terms of I.Q.) and the reading test (in terms of reading score) were similar to that in Fig. 3.

This curve is not like the symmetrical normal curve of distribution but is a *skew curve*, and shows marked *asymmetry of a positive kind*—the mean I.Q. for the group of boys was much below the mean for a normal representative group of corresponding ages.

Similarly when the test is given to three very bright classes of pupils, age 9 to 11, the resulting distribution curves based on the I.Q.'s and on the reading scores shows asymmetry of the opposite kind, they are *skew curves of a negative kind* like that in Fig. 4.

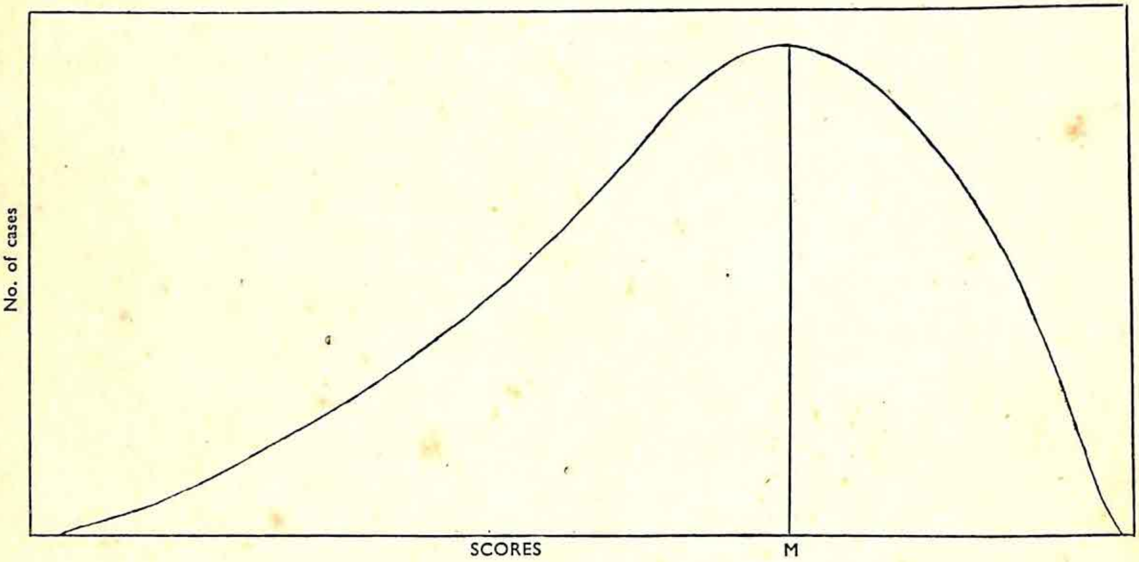


FIG. 4.—Skew curve of a negative kind, that is, scores are massed at the upper end and there is a skewing towards the lower or negative end.

The mean of the selected sample of pupils is well above that of larger representative samples of pupils of ages 9 to 11.

The skewed curves result from the nature of the samples of pupils, very dull in one case (Fig. 3) and very bright in the other (Fig. 4), so that there is marked bias.

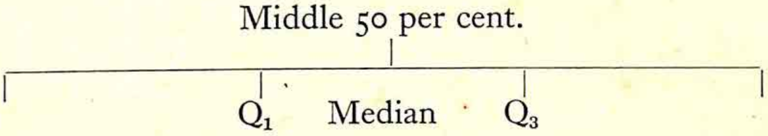
For the class teacher similar skewed distributions may arise from the variations in the difficulty of the test he employs with particular groups of testees.

DESCRIPTION OR CLASSIFICATION OF TEST SCORES OR MARKS

Knowledge of the way in which scores are classified in groups and shown in graphical form is not enough. There is also the need to know, in numerical terms, the more exact composition of the group of testees and their scores, and also the relative value of any individual performance. If, for example, John, aged $10\frac{1}{2}$, scored 36 marks out of 100 in an arithmetic test there is the need to know how good or how bad this performance is compared with (*a*) other boys and girls of the same age, (*b*) all other pupils who worked the test. These scores can be interpreted in different ways, some more precise than others.

Quartiles

All the scores for either the age group or for all the testees can be arranged in order and then the middle measure found, *i.e.* the median, or the one half way up from the bottom or half way down from the top score. Then we can find what are called the *lower and upper quartiles*—these are the measures which are one quarter and three quarters of the way up from the bottom score, the measures in between being the *interquartile range* and constituting the middle 50 per cent.



$$\text{Median} = \frac{N+1}{2} \text{ position}$$

$$\text{Lower quartile } Q_1 = \frac{N+1}{4} \text{ position}$$

$$\text{Upper quartile } Q_3 = 3\left(\frac{N+1}{4}\right) \text{ position.}$$

A mark or score which falls within the measure above Q_3 in the upper quartile, is better than at least 75 per cent. of all the other marks. But this is a rather gross way of interpreting the value of scores or marks, for all we do is to put the scores into three classes, or four classes,[1] if those in the middle 50 per cent. are related to positions above or below the median.

Mean or Average

In general, however, the educational psychologist prefers to describe any set of scores[2] or marks in terms of the average or *mean* as the *central*

---

[1] The interpretation could be made finer by determining, after finding the scores, the equivalent position of each score in terms of 1 to 100 positions. Thus the value of any single performance in respect to the whole group could be given in terms of a ranking 1 to 100, and its percentile position could be stated.

[2] Scores in terms of attainment or achievement ages are considered on p. 25.

tendency. The mean (M), where the marks (scores) are few in number, is found from:

$$M = \frac{\Sigma}{N} \text{ where } \Sigma = \text{sum of all the scores}$$

$$N = \text{number of cases.}$$

Where there is a large number of scores the mean is best obtained by arranging the scores in classes (*e.g.* 0-4, 5-9, 10-14, etc.), and then calculating the sum by multiplying the mid point of each class by the number of scores falling in each class.

$$\textit{i.e. } M = \frac{\Sigma fx}{N} \text{ where } x = \text{mid point of class}$$

$$f = \text{frequency of scores in the class.}$$

But where the scores are very numerous then the process of finding the mean is most economically done by using a device known as an *arbitrary* or *guessed mean*.[1]

Having found the mean it is necessary to indicate how the marks (measures) vary about it, that is, their dispersion or scatter. This could be indicated by the *range*, but it is not a good measure as it depends on the two extreme cases, the highest and the lowest, and these might be many marks from either of the next measures.

Standard Deviation

The best way of expressing variability is by calculating the *standard deviation*. This is obtained by finding the deviation of each score from the mean—scores above the mean giving a positive deviation, those below it a negative deviation. These deviations are then squared, summed, and divided by the number of cases. The square root is then obtained.

Thus standard deviation[2] (S.D.) or $\sigma = \sqrt{\frac{\Sigma(d)^2}{N}}$.

Where σ = S.D.

$\Sigma(d)^2$ = sum of the squares of the deviations from the mean of the scores.

N = number of cases (N − 1 for under 100 cases).

Marks or scores can only be interpreted when there is a measure of their central tendency, *i.e.* the mean or average, and when we know how the marks are dispersed about the mean, that is their standard deviation. Marks themselves have no intrinsic value, a mark of 70 per cent. doesn't mean anything at all unless we can relate it to the mean and the standard deviation of the total marks or scores. As Vernon says, we will never become scientific in our marking " so long as it is confused with value judgments . . ."

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[1] Details of how to calculate this can be obtained in *The Measurement of Abilities*, pp. 50-51, P. E. Vernon (University of London Press). *The Scaling of Teachers' Marks and Estimates*, chapter III and appendix II, D. M. McIntosh, D. A. Walker and D. Mackay (Oliver and Boyd, 1949). *Statistics in Psychology and Education*, pp. 17-24, H. E. Garrett (Longmans).

[2] See Vernon, pp. 54-59 and Garrett, chapter III.

Take for example this set of marks in English (maximum 100), 72, 68, 65, 62, 60, 59, 57, 56, 55, 54, 53, 52, 50, 50, 50, 49, 49, 48, 45, 43, 43, 42, 35, 31, 30, and this set of marks in Arithmetic (maximum 100), 90, 83, 80, 75, 71, 70, 68, 65, 65, 63, 60, 60, 58, 55, 54, 50, 50, 49, 48, 45, 35, 30, 25, 20, 15.

The mean of the English = 51·9. S.D. = 10·4.
The mean of the Arithmetic = 55·2. S.D. = 19·3.

It is obvious that a mark in English does not represent the same relative level of ability as a similar numerical mark in Arithmetic, and that to find a total on which to base an order of merit it would be unsound just to add the raw scores.[1]

STANDARDISED TESTS AND TEACHERS' TESTS

It is desirable for teachers to know that a standardised test is a carefully constructed instrument with certain characteristics. Scientific methods have been used in the selection of its items, in determining the discriminative value of the items, in calculating its validity and its reliability as a measuring instrument, and in its standardisation.[2] It differs from the ordinary test employed by a teacher in the course of his work, such as a terminal test, because, in the main, it has taken into consideration a large representative sample of all pupils of a particular age range or of a particular ability. The test averages or norms on which the standardised test is based are those derived from large numbers of children and, therefore, such averages or norms admit of comparisons being made between children from different schools and even from different areas.

The teacher's test is compiled quickly to test certain work taught over a limited period; thus an arithmetic test for a backward class would differ very much from that of a test for a class of bright children. The teacher's test aims at enabling him and his pupils to gauge how much they have learnt in a certain subject in a comparatively short time. A test of such a kind can hardly be said to serve its purpose if most members of the class do not score at least 50 per cent. on it, *i.e.* unless the material is taught very ineffectively or is unsuitable in the first place. But because the teacher has not previously tried out his test he sometimes finds that his judgment has been at fault and he sets a test which is far too difficult, and hence discouraging. The class then gets a low average result and the distribution is of a positive skewed kind (Fig. 3), or the teacher sets a test which is so easy that he has no means of finding out the relative learning capacities of his various pupils, except perhaps those in the lower quartile whom it tends to spread out. Naturally, there is a place for the teacher's test which gives a much skewed result of a negative kind with a high average score (Fig. 4) and which enables a large proportion of the class to gain nearly full marks—not enough use is made of such tests as a means of encouragement to further efforts. Sometimes it is not necessarily the material the teacher selects for his test that gives a faulty result, but because there are too few questions, in which case chance may play too great a part. Or again the questions may be badly framed, leading to doubt or ambiguities in the minds of the testees, or the questions may be markedly unequal in relative difficulties for which no allowance is made in the construction of the test and in the instructions to the testees.

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[1] An excellent little book which deals with such problems in a simple sound way is *The Scaling of Teachers' Marks and Estimates*, D. M. McIntosh, D. A. Walker and D. Mackay (Oliver and Boyd, 1949).

[2] Teachers can read more about these measures in *The Measurement of Abilities*, Chapter II P. E. Vernon (University of London Press).

OBJECTIVE MEASURES. VALUE OF M.A. AND I.Q.

While teaching will always remain an art as much as a science, there are many aspects of instruction which are only effectively realised if they derive from scientific methods.

Thus in assessing a pupil's school work or educational test results it is essential to make our evaluations in relation to the pupil's general intelligence, about which we should know two things for each pupil, namely the *level* of intellectual development he has reached, and the *degree* or rate of his intellectual growth. *Level of intellectual development is indicated by the mental age* (M.A.), as determined by an intelligence test. *Degree of intellectual ability*, or, more accurately, the rate of intellectual growth, is indicated by the intelligence quotient (I.Q.), which is a relationship between the pupil's chronological age and his mental age.

An estimate of the mental age of our pupils is of immense value for it helps in three ways. It enables us :—

(1) To evaluate fairly each pupil's school work.

(2) To indicate with reasonable accuracy the scholastic level at which each pupil should be working.

(3) To estimate the kind of intellectual tasks (*e.g.* reasoning problems) with which each pupil could be expected to succeed by virtue of his level of intellectual development, that is provided there is no serious limitation in experience.

Obviously mental age will increase as the pupil matures with increasing age, thus a pupil of chronological age (C.A.) 8 years with an M.A. of 7 years will, in all probability, have an M.A. of 8·8 years when he is C.A. 10. When he is 8 years of age we should only expect him to be doing school work of about 7-year-old level, but when he is 10 he should be able to reach scholastic standards comparable with those of the average 9-year-old. We should not expect him to be working much above the 7-year-old level at 8, or the 9-year-old level at 10, but under normal conditions he is capable of working to these levels.

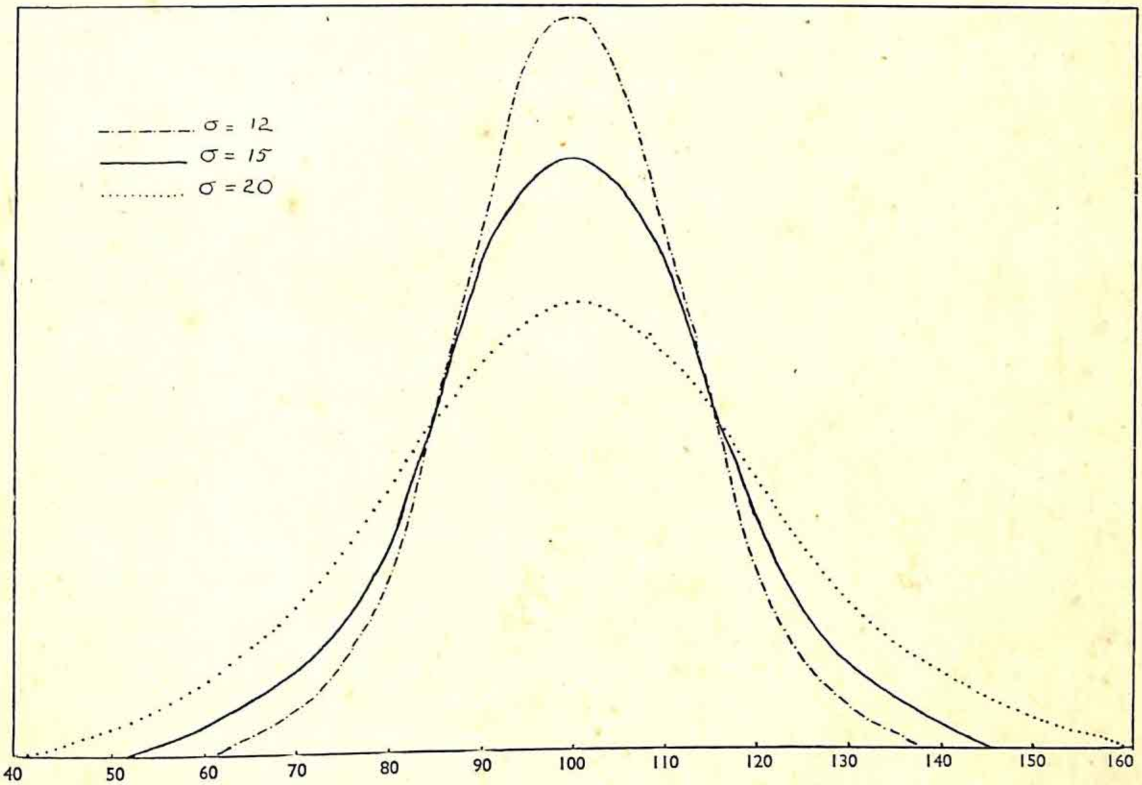

FIG. 5.—Normal Distribution curves for three different Standard Deviation Values.

Intelligence quotient is not as reliable a unit as mental age but it is a useful indicator or pointer.[1] For most children the intelligence quotient is a fairly reliable indication of speed of learning,[2] whether it is fast or slow. Naturally there are individual variations in I.Q. depending upon individual variations in mental growth, but these are less common than changes in I.Q. which result from faults or variations in the measuring instrument or changes in the measuring situation. The most frequent source of differences in group test I.Q.'s between one testing and another is due to the use of different tests which have been standardised on test populations having different distributions, that is, on populations which differed in the way they were spread out from the mean, or in their ranges as expressed in terms of standard deviation (see p. 6). We can really only compare I.Q.'s which are based on standardisations of equivalent standard deviations. It is for this reason that we get different proportions of I.Q.'s, particularly at the upper and lower levels, with different tests based on different S.D.'s. Fig. 5 gives the normal distribution curves for three different S.D. values, $\sigma = 12$, $\sigma = 15$ and $\sigma = 20$.

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[1] For a very brief comment on recent trends in intelligence test findings see "The Development of Education Research in Great Britain," Part II (*Brit. Journ. Educ. Psych.*, Feb. 1948). Also, Burt's critical notice of *The Measuring of Intelligence*, G. D. Stoddard (Macmillan Co., 1943).

[2] The I.Q. *tends* to remain constant for a period of 2 to 3 years if the environment and general conditions remain fairly constant and if no adverse conditions influenced the initial testing.

It will be seen that there are increasingly larger proportions of I.Q.'s above 120 and below 85 or even 70 as the S.D. increases. This fact would have relevance to problems concerned with the selection, for educational purposes, of groups of pupils at either the upper or lower levels of I.Q. The numbers in the groups would depend upon the test used.[1] A test with a large dispersion tends to make bright children appear brighter and the dull children duller. From a test with an S.D. of 20 or even 25 we get higher I.Q.'s and lower I.Q.'s than a test with an S.D. of 15 or 16.

There is a practice effect in respect to intelligence tests, but this is not important after the second test finding, hence the need to give a practice test and to consider second or subsequent test findings as likely to be more accurate than first estimates of M.A. or I.Q. Or again, disturbing emotional elements in the test situation may, with some pupils, cause variation in the test result. However, in spite of these possibilities of individual variation against which all precautions should be taken, it is extremely useful to the teacher or psychologist to know whether the child's I.Q. lies, say, between 60 and 70 or 90 and 100, or whether it is in the upper ranges of, say, 120 to 130 or 140 to 150. This gives the teacher some estimate of each pupil's learning power, of how much work he can expect from each pupil, how quickly he will learn new material (under favourable conditions) and what he can expect from him in the way of future development.

An estimate of the intelligence quotient supplements our knowledge of the pupil's mental age. For example, to find that a 9-year-old boy has a reading age, for word recognition, of almost 9 years and for comprehension of 8·5 years gives us some information, but the picture is much fuller when we know that he has a mental age of over 12 and an I.Q. of 142—he is then clearly a case of unrealised intellectual ability, a not uncommon one, and usually associated with (*a*) paucity of cultural background, (*b*) emotional disturbance or (*c*) limitations in teaching.

Of course no objective estimates from tests can replace a full study of each individual, but we get a fuller basis for educational guidance if standardised test results are used to supplement information from other sources.

TEST RESULTS INFLUENCE TEACHERS' ATTITUDES

The need for a scientific approach to many teaching problems is increasing with the increasing tendency to consider the characteristics of individual pupils and to suit methods and materials to their mental make up and social background. But if we are to know the mental qualities and the exact attainments of our pupils we must measure these as objectively and accurately as possible, for objective measurements, free from personal bias, help us not only in the choice of methods but, what is more important, in the determination of correct attitudes towards our pupils.

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[1] In general most intelligence tests are standardised with S.D. 15 or 16.

Illustrative Example

Take, for example, a concrete case, that of Frank S., excellent home background, age 9½, whose parents wish him to enter a grammar school. On standardised attainment tests, Frank obtained arithmetic ages of 8·2 years (mechanical arithmetic), 8·3 years (problem arithmetic), a spelling age of 7·9 years, a reading age (word recognition) of 8·8 years, and a written English level of 8·5 years (as determined by median sample compositions). Frank has on two successive occasions obtained intelligence quotients of 84 and 86. Whether his I.Q. is 84 or 86 does not matter—it is almost certain that it is within the range of I.Q.'s 80 to 90—what does matter is that his potential intellectual power is not represented within the range 105 or 110 to 120, for research results show that it is only very occasionally that children with I.Q.'s of less than 100 or 105 really succeed in the academic courses of a grammar school, whose pupils have been selected from the top 20 per cent. (or less) of the pupil population of 10+ and 11+ years.

Frank's parents say he is lazy and the teacher, before knowing the test results, thought the boy could do better. But the test results reveal that Frank is working to capacity, that he is not a suitable candidate for a grammar school, and that he should not be pushed unless we wish to run the risk of his developing an anxiety condition.

It is a simple step from the evidence provided by such cases to understand that many wrong attitudes towards the learning power of pupils (which create a wrong learning atmosphere for the pupils) would disappear with an adequate use of standardised tests.

PRECAUTIONS AND PURPOSES IN TESTING

That standardised tests may be of great value in teaching and in school organisation has now been adequately demonstrated, but that the extent of this value is dependent upon the choice of the tests, the care in their administration and the skill in the interpretation of their results is not quite so widely recognised. And it is in this direction that we need to achieve greater efficiency in developing testing programmes. The knowledge which should influence those selecting and using tests may be briefly summarised under the following headings :—

(1) Nature of tests.
(2) Validity and reliability (self-consistency) of tests.

(3) Standardisation of tests.
(4) Tests for particular groups of children.
(5) The conditions influencing effective administration of tests including general and detailed instructions for giving tests.[1]
(6) The interpretation of test results and the limitations of tests.
(7) Follow up measures based on an interpretation of test results.

(1) *Nature of Standardised Tests*

Teachers, administrators and psychologists should be conversant with the different types of tests and should be quite clear as to the nature and purpose of each type—whether a test is for diagnosis or for assessment, and if it has the latter function, whether it aims at measuring general intelligence, special ability, school attainments or general knowledge. This point is important; for example, there are some who think that tests of general intelligence and of general knowledge are synonymous. The exact nature of a test can only be determined by close acquaintance with it—descriptions in catalogues are often incomplete and sometimes misleading. It is essential that every test should be tried out with a small sample group of testees before attempting any large-scale application of it. But besides knowing what the test aims at assessing, one should also know to what extent it does this effectively and consistently.

(2) *Validity and Reliability (or Self-consistency) of Tests*

It is necessary for the compiler of any test to assess its *validity*, i.e. *to prove that his test is a valid measure of what it purports to test*. Usually this is done by comparing results obtained from the test with other known estimates of the ability or attainment that is being measured.[2] The comparison is made by use of a common statistical device known as a correlation coefficient, and *the degree of agreement between the test results and the criteria* of validity employed, is called a validity coefficient. In general these coefficients should be at least 0·85 or better and should be at least 4½ times their probable error.[3] In addition to having a valid test of a particular ability, trait or attainment, a test should measure what it is constructed to measure with consistent accuracy on successive occasions. We should know, as Spearman rather ambiguously called it, its *reliability*. We would not place much reliance on scales which gave us different results when weighing identical objects under similar conditions, nor should we place much reliance on tests which give us markedly different results with the same testees under similar conditions. Of course, from one occasion to another testees do not remain the same, and these variations from time to time in emotional attitudes and physical states of testees tend to reduce the reliability of even the most scientifically constructed test—the variations indicate the need for supplementing test results with additional information.

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[1] Topics 5, 6 and 7 are considered in detail on pp. 20-24, 27-36.

[2] Obviously this is not the only way of validating a test—the results of a factor analysis of the sub-tests also give some information on validity.

[3] The probable error (P.E.) of a correlation coefficient is an indication of the extent to which the coefficient so obtained is dependent upon chance, in other words, the extent to which the coefficient obtained from the scores of the sample of testees used is free from sampling errors. The P.E. gives us a guide to the trustworthiness of the coefficient obtained and indicates the elements of unreliability or uncertainty which enter into the situation.

The conditions which influence the reliability of a test may be related (*a*) to the test itself—the number, nature and range of difficulty of the items, or (*b*) to the testees doing the test—particularly their age, their intellectual levels and their temperaments and emotional attitudes.

Reliability (or self-consistency) is calculated similarly to validity, *i.e.* by means of a correlation, and is expressed as a coefficient, known as the *reliability coefficient*—this should not be less than 0·90. Reliability is usually determined by correlating results from a repetition of the test to the same testees over an interval of time, by correlating comparable halves of the test given to the same group of testees, by applying parallel forms of the test, or by repetition of the test by different testees. It may be checked by an analysis of variance of results from the test,[1] *i.e.* reliability can be estimated in terms of the proportion of the total amount of variation attributable to the true value of the scores, and unreliability as the total amount of variation attributable to error values.

(3) *Standardisation of Tests*

Those who use tests should make sure that the standardisation of each test, *i.e.* the norms of performance with which one can compare the results of any testee, have been derived from sufficiently large numbers and that they are expressed in useful and adequate units. The object in standardising a test is to obtain scores in some objective form which can be used as a basis upon which to assess each individual testee's performance, that is, to estimate the goodness or badness of his performance when compared with other testees who took the test. Strictly speaking, the test norms for the test should come from the area in which the test is being used. We need more local standardisation of tests, such as those carried out in Kent by the Kent Education Committee for all schools using certain tests for the Kent School Record Cards.

Scores in Terms of Ages

Usually test scores are given in terms of mental ages if it is an intelligence test, and attainment ages (*e.g.* reading age, spelling age, arithmetic age) if it is an attainment test. To put it very simply, each pupil has a known *chronological age* and theoretically speaking the *average* pupil's intellectual or mental development should be level with his chronological age. His attainments in school work expressed in ages for the various school subjects, for which standardised tests are available, should also be about level with his chronological age.

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[1] Those requiring fuller information on this should consult Burt's article "The Reliability of Teachers' Assessments of Their Pupils," *Brit. Journ. Educ. Psych.*, June 1945.

Thus there would be available for each pupil :—

(i) A *mental age*, which is obtained from an intelligence test score and provides, as we have already indicated (p. 8), an estimate of the level of the pupil's development in general intelligence.

(ii) *Attainment ages* for various school subjects which are obtained from the various standardised tests in school subjects. Thus an arithmetic age, or a reading comprehension age indicates the level reached by the pupil in arithmetic or in reading comprehension.

(iii) An *educational age*, which indicates the average level of attainment reached by the pupil in his school work. The educational age is found by averaging the separate attainment ages in the various subjects.

Children of *below* average intelligence have mental ages, and usually educational ages, *below* their chronological ages, while pupils of *above* average intelligence should have mental ages and educational ages *above* their chronological ages. But this is not always true with all children, and it is the lack of correspondence between mental, chronological and attainment ages[1] that is of interest to teachers. As we have pointed out elsewhere[2] there are, for the same pupils, natural variations in attainment age from subject to subject dependent upon the influences of opportunity, interest, and teaching method which differ for different subjects. Minor differences between attainment ages from subject to subject need not concern us—it is only when there is a marked difference of 1½ years or more in the case of one or two allied subjects that there is the need to investigate the difference carefully.

The attainment ages from attainment or achievement tests are determined from the raw scores (*i.e.* the scores initially obtained) of a test by plotting the averages of the raw scores of all testees in each year's age group, for which the test is constructed, against the mid points of each age group. Thus for the *Mechanical Arithmetic Tests*, Forms A and B, the table of norms or arithmetic ages given on p. 105 were found in this way. The average scores for all the pupils in the age ranges 6·0 to 6·11, 7·0 to 7·11, 8·0 to 8·11, 9·0 to 9·11, 10·0 to 10·11, etc., were calculated, and with these average scores as ordinates and the mid points of the age groups $7\frac{1}{2}$, $8\frac{1}{2}$, $9\frac{1}{2}$, $10\frac{1}{2}$, etc., a line of norms is plotted and represents the line of norms of all testees whose arithmetic ages are the same as their chronological ages.[1] Fig. 6 shows this line.

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[1] The problem is also influenced by the fact that there is not an absolute uniform relationship between units of mental and attainment growth as compared with increase in chronological age. This is more pronounced in adolescents than in pre-adolescent years.

[2] This problem has been discussed in some detail in *Backwardness in the Basic Subjects*, pp. 50-54 (Oliver & Boyd).

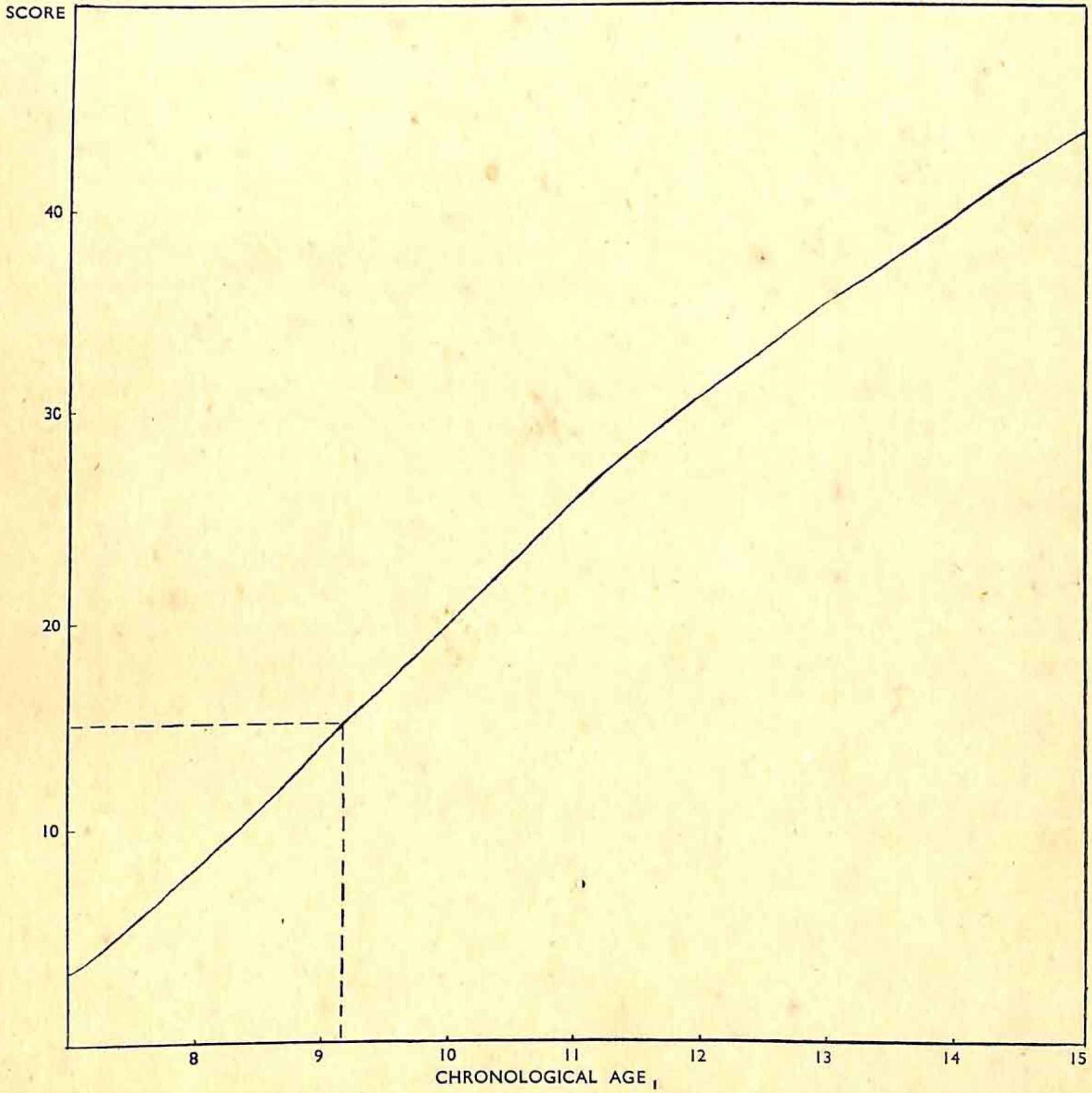

Fig. 6.—Average scores plotted against mid points of age groups to obtain line of norms.

Our argument can now be of this kind: pupils of $7\frac{1}{2}$ years score an average of 6 marks on the arithmetic test (*i.e.* 6 marks represents the arithmetic score of the average pupil of $7\frac{1}{2}$), any pupil who makes a score of 6 has an arithmetic age of 7½ years. We can, therefore, read off the equivalent attainment age for arithmetic (or arithmetic age) for each testee from his score.[1]

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[1] Naturally such a line of norms finally emerges as the best fitting line which has been obtained after comparing the initial line with the averages of scores month by month in a selected age group. The intervals between the age groups and the standard deviations of each age group are also carefully examined before accepting a final line of norms.

(4) *Tests for Particular Groups of Children*

It is important that tests should be selected to suit the needs of particular groups of children. Here the first important consideration is the *age range of the testees* for whom the test is required. In general a test with a fairly narrow age range is more effective—the wider the age range it purports to cover the less fine is the grading of its items and hence the less reliable will it be. A test which covers an age range 7 to 14 is bound to be somewhat inaccurate at both ends of the scale. This grading of material over a narrow age range is of greatest importance in the testing of young children up to 8 years of age.

A second point of concern is the suitability of the test to the *intellectual calibre of the testees.* A test that will suit average and bright children of a certain age range may not suit dull or backward children of the same range. This is noticeable in the choice of group intelligence tests for backward pupils, for whom a verbal group test is quite unsuitable. It is necessary for pupils to have reached a reading age of 8+ to be able to do themselves justice in a verbal group test of intelligence. Similarly with the testing of reading and arithmetic for backward children, it is useful to select more finely graded tests covering a lower attainment range (irrespective of their chronological ages).

[1] Those further interested in the statistical basis, and also in the limitations, of such procedure should read the new Appendix V, pp. 444-446 in *Mental and Scholastic Tests*, C. Burt, second edition 1947 (Staples Press).

II. TESTS AND THEIR SPECIAL USES

Types of Tests

In the main, educationists make use of five different forms of standardised objective tests. These are :—

(1) Tests of general intelligence or mental ability.
(2) Tests of attainment in school subjects.
(3) Tests for the diagnosis of backwardness in a school subject.
(4) Tests of special abilities.
(5) Tests of prognosis in respect to future progress in school subjects.

Some of these tests may be used generally in schools while others may have only limited use for special purposes, as in a Child Guidance or an Educational Clinic.

(1) *Intelligence Tests*

A test of general intelligence or mental ability is designed to estimate innate mental ability rather than acquired knowledge. More simply, it is a test by which we can obtain a reasonably accurate *measure of a child's power to think accurately or his ability to learn.* Ability to learn is merely intelligence in action, and may be considered (interpreting Spearman's noegenetic laws rather liberally) as the ability to understand and assimilate the relevant relationships in a learning situation and to apply these relationships to new or similar situations.

Naturally the expression of general intelligence is measured through the medium of a fund of acquired knowledge, common in the main to the age range or age groups of the pupils being tested. Tests of intelligence, in common with those of attainment and specific abilities, are so constructed as to give measures which will enable users of tests to compare one testee with another—usually by providing tables of the raw scores in terms of mental ages, standard scores, or intelligence quotients. This quality of a test is the result of its *standardisation.*

(2) *Attainment Tests*

A standardised attainment test measures acquired knowledge in a particular field, usually in school studies. In other words it *provides objective assessments of the levels reached by pupils in various school subjects.* The results of an attainment test are usually expressed in terms of subject age. Thus from a reading test in word recognition we can obtain an estimate of reading age, that is, the level of performance in the mechanics of reading reached by the testee compared with other children—a reading age of 10·0 years means that the testee's knowledge of word forms is equivalent to that of the average child of 10 years of age chronologically.

Usually attainment tests consist of a relatively large number of carefully selected and scientifically graded small items—words, sentences, paragraphs, sums, problems, or other exercises—objectively considered in relation to stages of progress in a school subject at various levels. Such tests endeavour to reduce to a minimum the actual amount of writing that the testee has to do so that relative differences of speed in the mere mechanics of the setting down of the material do not adversely influence the measures of what the child knows about the subject.

(3) *Diagnostic Tests*

The diagnostic test is constructed not to assess levels but to reveal difficulties in school subjects.[1] It is based upon an analysis of the mental processes involved in learning a subject—as in learning to read or to spell—or an analysis of the material required in the fundamentals of the subject, as in mastering arithmetic. The diagnostic test unlike most tests of intelligence and attainment, is applied without time limit, and may extend over a number of successive testing occasions. Thus diagnostic tests are useful for discovering difficulties encountered by pupils who are failing to make normal progress in school subjects.

(4) *Tests of Special Abilities*

Tests of special ability aim at revealing the degree of development and also, to a lesser extent the latent power[2] *of individuals in special fields.* Thus there are tests of musical ability, mechanical ability, artistic ability, linguistic ability, and so on. Most tests in such fields measure both development and promise, but some tests are weighted more towards assessing the level of development in the special ability, while others are weighted towards estimating the potential power, or perhaps unrealised skill, possessed by an individual. So far there is no certainty as to what each of the various special ability tests do test—without doubt they measure general ability plus special ability, which may be partly dependent upon the influence of innate characteristics of the individual and partly upon the results of opportunity and training. Thus the special ability of an individual derives its specificity from both the special characteristics of the possessor and from the nature and form of the media in which the ability is being expressed. Special abilities, it should be noted, are not synonymous with factors (forms of classification) as determined from the factorial analysis of a set of scores or measurements.

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[1] Of course errors from attainment tests may provide valuable diagnostic information, and even errors in the Terman Merrill test may be indicative of certain weaknesses in specific abilities or in personality (see *The Diagnostic Value of the Terman Merrill Test*, M. Highfield, M.A. Thesis University of London Library, 1945).

[2] Strictly speaking a test which seeks to measure latent power alone is termed an aptitude test.

(5) *Prognostic Tests*

Many tests have prognostic value, but more specifically the *prognostic test in a school subject is designed to discover beforehand the degree of success that is likely to attend a pupil's efforts in studying that subject.* Prognostic tests relate almost exclusively to the secondary school field ; for example, we have prognostic tests for modern languages, for classics and for certain branches of mathematics. Prognostic tests are difficult to construct, but obviously they would be of inestimable supplementary evidence for guiding pupils at various stages of a secondary school course.[1] At present we adopt, in a limited form, the practice of allowing pupils to pursue subjects for a certain time and then to continue or discontinue them on the basis of their degree of success or failure in the subjects. This is wasteful to some extent, and obviously it would be better if we could discover potential failures before the pupils commence a course in which they were not likely to succeed. On the other hand interest as well as aptitude determines success in school subjects, and there is no doubt that the personality of the teacher, the methods he adopts and the skill he employs in presenting material also have a major influence on the progress of his pupils. At the same time it is possible that, by using prognostic tests in conjunction with the estimate of teachers, there could be more effective guidance of secondary school pupils in the early stages of their school courses.

Earle, in his work at Kirkcaldy High School, has for the past fourteen years made a special study of the problem of educational guidance within the secondary school,[2] and in so far as Kirkcaldy High School included pupils covering a fairly wide range of general intelligence the results of his work have significance for teachers in both secondary grammar and modern schools.

ATTAINMENT AND DIAGNOSIS

The tests in this book have been constructed primarily for assessing attainments and diagnosing difficulties in school subjects, but they also yield prognostic information of a scholastic kind about pupils' abilities in special fields; they also provide suggestive pointers on temperamental qualities of the testees. Obviously the nature and value of the supplementary information derived from the test results depend upon their being used with insight and understanding, and upon notes on qualitative responses of pupils being recorded during the test situations and then related to other information about the total personality of each testee.

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[1] Teachers interested in the problems of prediction of success in secondary school and university courses should read *The Reliability of Examinations*, C. W. Valentine (University of London Press, 1932).

[2] See "Tests of Ability for Secondary School Courses," F. M. Earle. Scottish Council for Research in Education, X (University of London Press, 1932). *Reconstruction in the Secondary School*, F. M. Earle (University of London Press, 1944). The tests used are available in the *Duplex Series of Ability Tests*, F. M. Earle (G. G. Harrap & Co.).

All testing should have both its qualitative and quantitative aspects, and should be regarded as only *one* part of the study of the whole child—we cannot just split off bits relating to the intelligence or the attainments or the special scholastic difficulties of children and examine these separately in a quantitative way. All aspects of personality are involved in school work, and we should consider our test findings in a total and related way alongside information from other sources. This is particularly true in respect of information on emotional attitudes and home conditions which exert a major influence on work in school.

ADMINISTRATION OF TESTS

In test administration it is fundamental to remember that the testees are all active developing individuals with mental equipment which enables them to react in many different ways to the same test situation. Measurement in the field of human beings with their many uncontrollable variables of behaviour is difficult, more difficult than the form of measurement which faces the engineer, the physicist or the chemist who develops most of his experimental work in respect to inanimate matter. In assessing children, the value, and to some extent the validity, of the results are dependent upon the adequacy of the subjective influences brought to bear and maintained in the test situation by the examiner.

(1) *Atmosphere and Rapport*

The *atmosphere created* at the beginning of and during the test situation and the *rapport achieved* between tester and testee throughout the examination are of paramount importance in respect to both the quantitative and qualitative results obtained. The influence of these subjective elements in the testing is obviously much greater with individual than with group tests. With individual testing, adverse emotional reactions on the part of the testee may largely invalidate a test.

It is vital, therefore, in all testing, to assume, and if necessary cultivate, a friendly, pleasant and encouraging attitude. We should not by look, action or word indicate that the child is facing a difficult situation, that much depends on the result, that he might not do well, that there will be certain consequences if he does not achieve certain standards. In approaching the testee or testees it is advisable to explain in a friendly way the nature of the test, to ask for their co-operation and to let them know that they will be able to succeed with some items and that no one is expected to get every word, sum or item correct. Those working in schools and clinics should never fail to realise that, at all ages, children are rational beings, whose co-operation can be enlisted if one is natural in manner, if one does not have to stand on adult dignity (whatever that is), and if one looks at things from the child's point of view. After many years of this work we find that there are four main elements in successful testing.

(*a*) A rational approach

Explain clearly and without humbug to testees what you are doing (not necessarily what you are testing for). Ask for their help and co-operation, and in practically all cases you will get a generous and sincere response. Almost all children like doing tests provided they are conducted in an atmosphere of encouragement. They like to see how many small items they can complete in a test and it is certainly not a situation like that envisaged by the old lady at the school sports meeting when she wanted to know why the men made the poor boys run so hard.

(*b*) A friendly individual contact with the testees

Call children by their Christian names ; smile, look happy, and interested ; talk to the pupils about their homes, their families, their hobbies, about topical happenings, etc. ; let them feel that you are a natural person with interests similar to theirs. Above all let them realise that you are sincere, that you do not want to trick them, coerce them, or discover " their hippopotamus major," but that you and they are doing this testing together, perhaps as an experimental venture, perhaps as some good fun, perhaps in a co-operative way so that you will be able to help them over their difficulties. Obviously the nature of the appeal differs according to the nature of the test and the age and intellectual calibre of the testees.

No reference should be made to the test as an examination and all efforts should be made, if there is previous evidence of it, to dispel any fear element or competitive atmosphere in a class.

(*c*) An element of humour

Humour is a most effective element in any human situation. Children are attracted to adults who can occasionally introduce some humour in the day's round of activities. Not infrequently one finds in children's attitudes to teachers that pupils are not attracted to those teachers who are *too* reserved, taciturn or even solemn and lugubrious—as one 12-year-old told me, he " didn't like his art teacher because he *never* smiled."

(*d*) Encouragement and praise

Encouragement and praise are powerful incentives with children and adolescents—far more powerful than some teachers seem to realise. A few words of encouragement to a not very successful class, a few phrases of assurance that they will " do all right " and that they will be able to find some items they can do will often make a great deal of difference in the persistence and application that pupils use in tackling a task. Particularly is this so in individual testing, where it is important to encourage pupils after each response, care being taken of course not to suggest that incorrect responses are correct ones.

For example, in giving the graded word reading test it is very necessary to create a friendly co-operative attitude on the part of the testee, and to encourage him as he goes from word to word—" Yes, you are doing quite well ; " " Yes, try this one " (even if the last word was not correct) ; " That's right, keep on, you are working well." With correct responses from an apprehensive testee an occasional " good "—" I thought you could get all that line right " will help him on to further efforts.

(2) *Provide for Maximum Effort*

Obviously in giving a test we should try to provide some initial success and we should not continue to the stage of *fatigue*. This is most important when giving the diagnostic arithmetic tests in this manual—testing periods should be kept short to get maximum accuracy in the assessment. Teachers and psychologists will find with diagnostic tests, where there are no time limits, that there is the need for a number of successive testings to make the analysis thorough and, at the same time, to obviate any fatigue, or worse still, any boredom.

To some extent we can help testees if, with almost all tests, we allow them to *use pencil*—there is no need whatever in most tests for the added difficulty of manipulating a pen and ink, and perhaps blotting paper. One is not wanting to test power of co-ordination but the level of spelling, arithmetic, English, as the case may be. For the same reason rulers and india rubbers should not be permitted during the testing. This use of rulers or erasers will only cause the meticulous, rather over-careful children (or the pupils of over-careful teachers) to lose time and hence be at a disadvantage compared with those who do not rule every line or rub out every error.

No distraction. Allied to this is the need to remove from the desks any open books which may distract the attention of the pupils. As far as possible (except perhaps for the supervision of young or backward pupils in non-verbal intelligence tests) one person should carry out the testing ; the more people there are in the room the more distracting is it for the testee. We have seen unfortunate children trying to do an intelligence test while the teacher talked almost all the while in low but just audible tones to a colleague or to the headteacher—a glaring example of not looking at things from the child's point of view. During group or individual testing of the written kind there should be absolute quiet (or as near as one can get to it).[1] Those supervising the test should neither " prowl nor peer." Nor should they look over the shoulders of children at their work ; nothing distracts some pupils more in arithmetic than this. Naturally, there may be the need to see that, with a few testees, they turn over the pages and that there is no collusion with neighbours, but teachers should not walk about ceaselessly. Remembering that mathematics is a subject demanding maximum concentration on the part of pupils, we should try to provide for the testees external physical conditions which are conducive to concentration and persistence.

(3) *Adhere Strictly to all Test Instructions and to Timing*

An important matter in the use of tests is that of adhering closely to the procedure laid down in the handbook or manual of directions. All examiners should make themselves fully conversant with the instructions and should observe these absolutely. This is particularly so where material has to be presented to testees, where oral instructions have to be given and where timing has to be made. Unless every aspect of the instructions, general and specific, is observed in the strictest detail then we are liable to vitiate the means by which comparisons can be made between the results of the pupils tested and those from whom the norms or standardised scores were obtained.

With sub-tests demanding timing it is as well to mark these clearly in the handbook beforehand, and to *write* down the times of commencement and completion for each test or sub-test. If a testee has to be absent from the test for a minute or so he should be given extra time.

One other item of procedure is that relating to examples and practice sheets. Where these are to be included as part of a test then the full number of examples should be given, with adequate time allowance, even though the examples may seem very easy. Printed tests should always be used in their original form, that is, in the printed sheets or booklets—any attempt to reproduce them in the less legible, smaller type of a duplicating machine will to some extent produce variation in the standard conditions.

Similar strict observance of instructions applies equally to the marking of the answers and to the method of scoring. All totalling of scores should be carefully checked.

(4) *No Coaching or Teaching when Testing*

While every effort should be made to encourage testees, a careful distinction should be drawn between legitimate encouragement and assistance.

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[1] Hardly possible where the school is near a railway line or in the middle of a busy thoroughfare.

It is easy, for example, to point to the parts of a word in a graded word reading test so that one almost breaks up the words for the testee, suggesting to him to try it piecemeal—this is coaching. But again, this example of coaching or teaching is quite different from drawing attention, in the same test, to a small word which a child has obviously missed and which he can correct merely by asking him to repeat it [1]

(5) *Recording of Responses* (*Qualitative*)

Finally, as we have stressed earlier, there is the need to make notes on qualitative aspects of the test, these are often very useful for later diagnosis. The only point of importance is that if these are entered during the test they should not be so made as to let the pupil think that he is being " weighed and measured " in every little detail of the situation. Make the whole thing as unobtrusive as possible, and give the impression that it is merely an unimportant side issue compared with his efforts in the test.

[1] See pp. 94-99, *Psychology and Teaching of Reading* (Oliver & Boyd).

III. RECORDING AND INTERPRETATION

A. RECORDING OF TEST RESULTS[1]

THE form of recording test results necessarily differs somewhat from the attainment test to the diagnostic test—attainment test results are largely in quantitative terms while those from the diagnostic tests are mainly of a qualitative or analytic kind. Naturally, assessment of levels reached in various school subjects is the first step in dealing with any pupil, advanced or backward, and these results in themselves have some diagnostic value. We might, therefore, consider first the methods of recording attainment test results.

(1) Attainment Tests

As we have already indicated the most useful way of recording results from attainment tests is in terms of attainment (or subject) ages as derived from the tables of norms, or formula given with each test (as in the case of the graded word reading and spelling tests). Raw scores of tests are of little use for comparison of pupils,[2] within a class or school, and almost valueless for comparison with pupils' results from tests in other schools. From the scores of tests in this manual one can calculate :—

$$\text{Standard score} = \frac{X-M}{\sqrt{\frac{\Sigma(x)^2}{N}}} \text{ that is, } \frac{x}{\sigma}.$$

(*a*) A reading age (i) for word recognition,	R.Age
(ii) for comprehension.	R.Age
(*b*) A spelling age.	S.Age
(*c*) An arithmetic age (i) for mechanical arithmetic,	A.Age
(ii) for problem arithmetic.	A.Age
(*d*) An English age for mechanics of English (for pupils of 9+ and over), punctuation, English usage, vocabulary and sentence structure.	Eng. Age
(*e*) A written composition age derived from median samples of written compositions.	Comp. Age

The average of any number of attainment (*or subject*) *ages will provide an educational age*, which represents an objective assessment of the average level reached in a number of subjects as measured by standardised tests.

For record card and for class-room purposes those using attainment tests are advised to enter their results as attainment ages for each subject, or if a suitable range of tests is used, as an educational age. It is obviously misleading to average two reading ages and an arithmetic age, or two arithmetic ages and a reading age and to regard the average as an educational age. This would not only be misleading, but grossly unfair to pupils who had a marked weakness either in reading and spelling on the one hand, or arithmetic on the other.

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[1] For elementary definitions of some terms used in scoring see p. 13, *Scores in Terms of Ages*.

[2] The raw scores of an unstandardised test may be converted into standard or z-scores which can then be added or subtracted or averaged from test to test. The standard score is the deviation (x) of the score (X) from the mean (M), *i.e.* X−M, divided by the standard deviation (σ) of the test.

Educational Quotient and Achievement Quotient

Two other measures sometimes used are the *educational quotient* (E.Q.) which is a ratio derived from comparing the educational age (E.A.) with the chronological age (C.A.), so that,

$$\text{E.Q.} = \frac{\text{E.A.}}{\text{C.A.}} \times 100$$

and the *achievement quotient* (A.Q.) which is a ratio derived from comparing the educational age (E.A.) with the mental age (M.A.), so that,

$$\text{A.Q.} = \frac{\text{E.A.}}{\text{M.A.}} \times 100.$$

But both measures have limitations and assume certain relationships which are not true. In making a comparison of educational age with chronological age to obtain an educational quotient we are assuming that chronological age is correlated more closely with school progress than it really is. Thus dull children *always* have low educational quotients ; and the same measure can mask the unrealised margin of talent in bright children, who are under-taught, or who are not applying themselves in school. Similarly the achievement quotient, though better for certain purposes of assessing the levels of which the pupil is capable, gives peculiar results with some pupils. Bright children are usually expected to do better than dull children, but with the use of the achievement quotient dull senior pupils often have a better chance of achieving normal or even advanced A.Q.'s because one compares attainment only with mental age and hence gives them the benefit of experience. The achievement quotient is really unsatisfactory if we compare pupils of unequal chronological ages. For example, if we compare the older dull pupil of C.A. 11, M.A. 8, E.A. 8½, who easily gains an A.Q. of 106, with the younger brighter pupil of C.A. 8, M.A. 11 and E.A. 9, who has only an A.Q. of 82, we find that we have set an extremely difficult task to the brighter younger pupil to bring his A.Q. up to 100. Progress in school is dependent on maturity and years of schooling, and in the cases quoted above an advantage of three years of these influences is given to the older backward pupil, while a handicap of three years enters into the calculation of the A.Q. of the younger pupil. For the younger brighter pupil we have considered only his advanced intelligence but this could not help him if he had not been taught certain school work, as for example in arithmetic.

For ordinary school purposes the best form of record is one which uses attainment and mental ages, with reference to the I.Q. as a guide to potential learning power. The relationship between ability and attainment is best shown on an individual card, in cumulative and graphical form, so that we can see at a glance the present levels and the rate of progress of each pupil.

Thus in Fig. 7 we have reproduced a form of individual record card[1] which can be used throughout a child's school career. One can enter in coloured ink the line representing the testee's I.Q. and then at each testing the mental age and various attainment or subject ages can be entered in colours. Thus the card presents quickly and adequately a picture of the child's progress from year to year in each subject and in relation to mental age and intelligence quotient.

In entering the I.Q. line, one should join the point of intersection of the mental age and chronological age to the appropriate I.Q. point in the top right-hand corner.

The attainment, or subject ages, for the various subjects should be entered at the time of testing. Thus in the above case when the testee was $9\frac{3}{12}$ years of age the attainment ages for arithmetic (6·6), reading (5·1) and spelling (5·0) were entered, namely, the points of intersection of $9\frac{1}{4}$ with 6·6, 5·1 and 5·0 respectively. The mental age for intelligence, as determined from intelligence tests, should be similarly entered.

(2) Diagnostic Tests

In recording results from diagnostic tests the most effective procedure is to enter all test results and errors in a small notebook kept for *each* dull and/or backward or maladjusted pupil. In this book can be entered also the results of intelligence and attainment tests and subsequent measures of remedial teaching.

B. INTERPRETATION OF TEST RESULTS

The follow up measures based on the interpretation of test results would include :—

(i) The classification, grading or allocation of pupils.
(ii) The diagnosis of pupils' difficulties in various school subjects.
(iii) Changes in curriculum content and in subject material to fit in with the information gained from the tests.
(iv) The changes in teaching methods, particularly the remedial methods, to be used with pupils who have been found to be either generally or specifically backward and in need of special help.

(1) Value of Attainment Tests

The main issue in the interpretation of test findings is to discern their value for future educational treatment, that is for both grading or grouping pupils and for teaching them.

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[1] See p. 28.

Alan F. Chronological age $9\frac{3}{12}$ (at first teaching)

A boy of average intelligence who had long absences from school. At 9 he was given special help and, as his yearly test results show, has made striking progress.

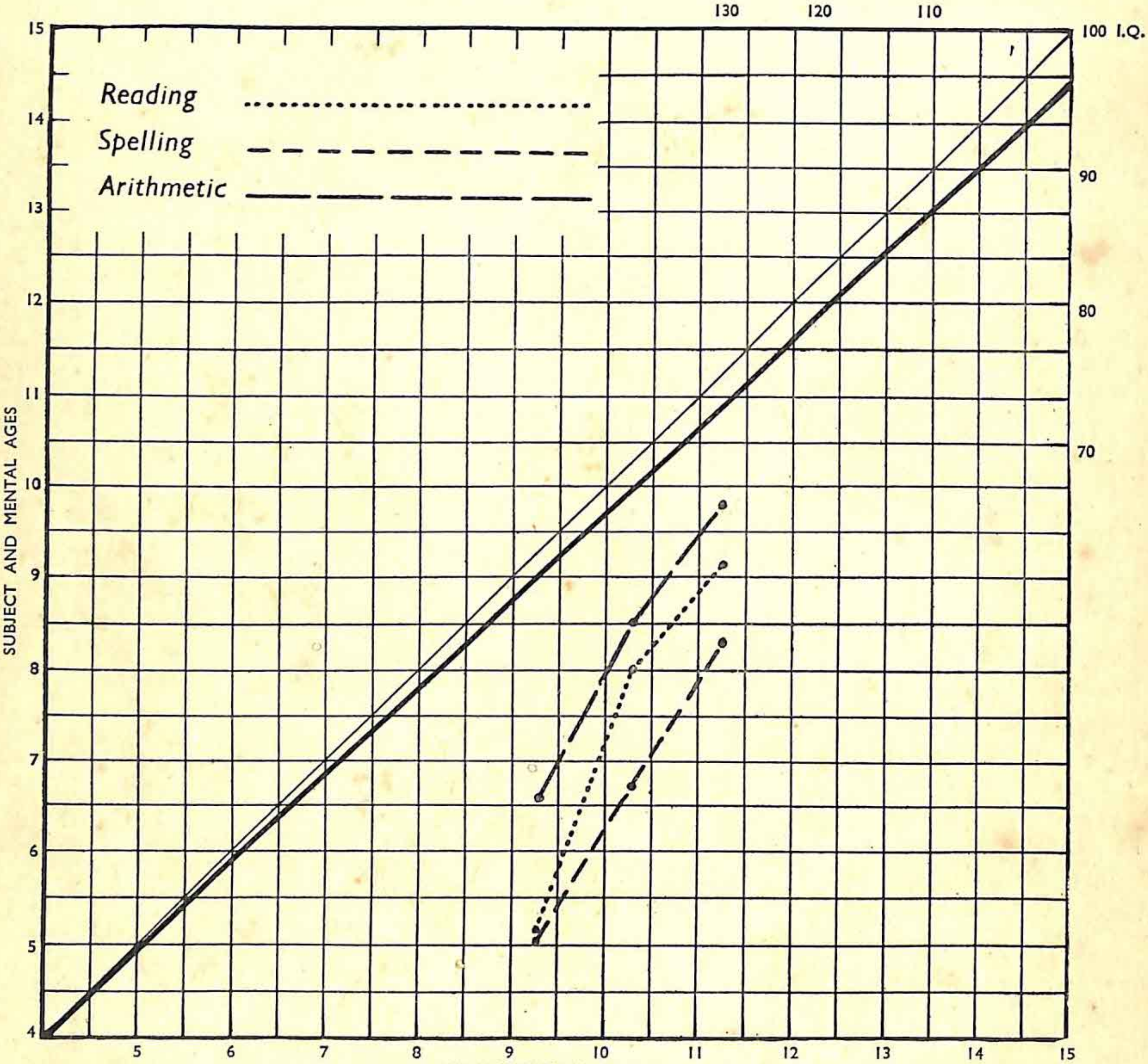

FIG. 7.—Graphical Form of Cumulative Record Card.

The thin line running diagonally from corner to corner is the 100 I.Q. line. The thick line is the I.Q. line for Alan F.

Classes, Sections or Groups

The results from attainment tests provide direct evidence on which to base the classification of pupils either within the school or the class. Where there is a wide range of pupils in both age and intelligence the results of standardised attainment tests will make internal grouping the more effective.

Selection of Methods and Materials

Attainment ages in various subjects can greatly assist the teacher in determining the nature of his method and in choosing material for the pupil. Attainment ages in reading, spelling and arithmetic in themselves indicate the level of the material with which the pupils should be working—high attainment ages require special attention in the provision of suitable material just as much as low attainment ages. A pupil of C.A. 9½ with a reading age of 12½ needs to have access to books which will satisfy his advanced level of reading, while a 9½ year-old with a reading age of 6½ requires a book the vocabulary and sentence structure of which is at a 6-7 year level.[1]

Similarly in the basic subjects teachers can obtain from attainment test ages pointers to the level of material with which children should be working—some are working with too easy material and some with too difficult. The attainment test results enable the teacher to provide immediate success and effective assistance just where and when they are required. Sometimes it is necessary to be rather ruthless—not with the child—but with the educational machine, to bring some pupils back to their correct levels. When this is done, instead of continuing to flounder and lose confidence, such pupils begin to push ahead. Although we have here stressed the values of the test findings for treatment of all backward children, yet their values should be interpreted with equal force, and subsequent effective action, in the case of very bright children. Scholars of 10 who have reading, spelling and English ages of 13 need special treatment—they don't want to waste time with formal English exercises or spelling lessons—they require opportunities for creative work (in small groups) which will allow expression for their high mental powers and their fast developing interests.

(2) INTERPRETATION OF DIAGNOSTIC TEST RESULTS

In this phase of educational guidance it is vital to remember that test results are only part of diagnosis. Most pupils backward in school, in one or more subjects, labour under emotional handicaps which may be partly the cause of their scholastic difficulties. Sometimes these adverse emotional conditions are school centred, as when failure, confusion (from poor teaching or discontinuous instruction) or censure result in loss of confidence and diffidence. What pupils need then is plenty of encouragement and quick initial success in fields in which they have failed.

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[1] On this and similar points see *The Psychology and Teaching of Reading*, F. J. Schonell, Chapter V (Oliver & Boyd).

Sometimes, however, the adverse conditions are home centred. The pupil may be insecure on account of his parents' attitudes towards him, towards each other or towards the school; he may be unduly criticised or even maltreated at home, or he may have little chance of restful sleep or of mental development. In such cases much good may be done through a trained social worker, or, in less extreme cases, through a Parents' and Teachers' Association.

The point is that some pupils are so "beaten down" by adverse emotional-social conditions, school centred or home centred or both, that their diagnosis should first indicate a period of therapy through some kind of play situation.

The fundamental principle in the interpretation of diagnostic tests is that the qualitative examination of the testee's work is much more important than any quantitative estimates of it. Sometimes the score made in a particular diagnostic test has special significance in so far as the result might indicate a certain type of weakness, but in the main it is errors made that provide most information about difficulties. Full details of the use of diagnostic tests in reading, spelling, English and arithmetic[1] have been given elsewhere, so that here an examination of a concrete case will suffice to illustrate the main points of interpretation which, in turn, should indicate the lines of appropriate remedial teaching.

(3) DIAGNOSIS OF DISABILITY IN READING AND SPELLING

Example of Case of Backwardness in Verbal Subjects

SCHEDULE

William L. Age $11\frac{1}{12}$. Mental Age $13\frac{2}{12}$. I.Q. 120.

Test R 1.—Graded Reading Vocabulary Test (p. 38) 8·1 years.

.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	x dancing (downstairs)	.	.	Thursday (thirsty)
.	.	.	.	.
.	x angle (angel)	x selling (ceiling)	.	x
x	x	x	.	x

31 words correct. R.A. = 8·1

---

[1] See *Backwardness in the Basic Subjects* for details of the diagnosis of disability in reading, spelling, and English composition, and *The Diagnosis of Individual Difficulties in Arithmetic* for similar information on disability in arithmetic.

Test R 2.—Simple Prose Reading Test " My Dog "
One error—catch (chose).

Reading Age Accuracy = 9·5 years.

William shows in this test a very good use of contextual cues and hence his reading age is in excess of that obtained from the graded word test.

Reading Age (Comprehension)—13 questions correct = 9·5 years.

Both these results show the influence of his superior intelligence, but because he is 11 years old and his reading age is 8·1 it is doubtful whether the simple prose test is as useful here as Silent Reading Test A or B would have been.

Test R 5.—Test of Analysis and Synthesis of Words Containing Common Phonic Units

.	.	.	.	x bag (beg)	.
.	.	.	.	.	.
.	.	.	.	.	x stay (say)
.	x (fire) fir	.	.	.	x here (her)
.	.	.	.	.	.
.	.	.	.	.	.
.	x sight (sing)	.	x break (bark)	.	.
.	x done (arm, stove)	.	.	.	x hunt (hurt)
.	.	.	.	.	.
.	.	x crowl (crawl)	x find (fine)	.	.
.	.	.	.	.	.
.	.	x there (they)	.	.	.

Auditory imperfection is revealed in his weakness in phonic analysis of words, shown particularly in his attack on words (stay for say, fine for find), his weakness of vowel forms (fire for fir, here for her), and his substitution of vowels in words (bag for beg) and his ignorance of vowel forms like ea, ur, aw.

Test R 6.—Test of Directional Attack on Words

The results of this test revealed no reversals or transpositions indicating that his weakness is *not* primarily due to a disability in visual perception of words (compare with case of Tom H., pp. 148-149, *Backwardness in the Basic Subjects*). On the other hand his errors, even in this simple test, further indicate an auditory weakness, thus :—

got (gote)
ton (tone)
whose (wose)
sad (sand)
lap (lad)
raw (rair)
pit (pig)

This evidence supplements that from Test R 6 on analysis of common phonic forms. Weakness in analysis (wose—whose) and attack on words, even common phonic combinations, produces errors as when he calls sad—sand, lap—lad, pig—pit. Furthermore, in this test he reveals his inability to give simple vowels their correct sound value as in got (gote) and ton (tone).

Test R 7.—Visual Word Discrimination Test

William revealed in this test a high proportion of words recognised at the first trial, and those with which he failed were selected correctly on the second trial. His result was 16 correct on the first trial, 8 on second trial, 1 on third trial. This result tends to confirm the diagnosis that his reading disability is mainly due to his auditory imperfection.

SPELLING

Test S 1.—Graded Word Test. Spelling Age 7·7

The significant errors shown in this, as far as the test was taken, were :—

doll (dul)
bell (bel)
by (my)
cold (colled)
talk (torck)
seem (seam)
folk (fock)
noise (nose)
remain (reamanes)
worry (wory)
dancing (darnsing)
else (eals)
through (though)
cough (coph)
fitted (fited)
spare (sper)

The errors give evidence of weakness of auditory analysis and sound-letter association. Although he is 11 years old he is ignorant of some common phonic units. Again these errors strengthen the diagnosis made through an examination of the reading test results.

REMEDIAL TREATMENT

(1) *Emotional Readjustment*

William needed a great deal of encouragement to reassure him that he could overcome his difficulty, and that he was in fact a clever boy. Early success and constant praise, combined with the security from a strong and continuous rapport with the teacher soon produced that psychic satisfaction which dispelled his hesitancy and impelled him to put forward full efforts to overcome his disability.

(2) *Remedial Teaching.*[1]

(*a*) Graded course of analysis—synthesis of words based on common phonic families. Considerable emphasis on tracing and writing to establish common patterns. Writing of sentences to involve application of patterns. For example having learnt the combination *ee* through writing and tracing 3 or 4 words of this phonic family, sentences were composed involving new words containing these two vowels for reading and writing exercises.

(*b*) Writing, spelling and reading were linked and extensive use was made of the graded words in *The Essential Spelling List* both in groups and in incorporated material for reading.

(*c*) Parallel with this work was reading practice based on word whole—sentence method. William first completed Book IV, *Happy Venture Readers*, then proceeded to the *Active Readers* (Ginn & Co.).

(*d*) Extensive simple comprehension exercises were taken from books he could read, e.g. *Read, Laugh and Learn Readers*, Book II, *Direct English*, Book I.

(3) *Result*

After Four Months :—
  Reading, Graded Vocabulary 8·8 years (improvement of 8½ months).
  Spelling Graded Word Test 8·3 years (improvement of 7 months).
After Seven Months :—
  Graded Reading Age 10·0 (improvement of 1·2 years in three months).
  Spelling Age 8·4.
After One Year :—
  Graded Reading Age 10·3.
  Silent Reading Age 10·3 (*Silent Reading*, Test B).
  Spelling Age 9·3.
Total Improvement in Twelve Months :—
  Reading 2·2 years.
  Spelling 1·6 years.

At the end of twelve months William with a reading age of 10·3 (C.A. $12\frac{1}{12}$) was doing a considerable amount of reading for pleasure. He had been introduced to some of A. Ransome's books to start off his independent reading.

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[1] See pp. 222-230 and 330-339, *Backwardness in the Basic Subjects* (Oliver & Boyd).

(4) COMPLEX NATURE OF TEST SCORES

Finally in the interpretation of test scores it is necessary to remember that a score from a test represents more than a measure of the attainment or the ability that the test purports to measure. Every test score is a complex result in that it represents a composite assessment of a number of different elements—the effect of general intelligence, the influence of home background, the result of teaching, the effect of a certain maturity or lack of it, the effect of a special ability and even the influence of the particular mood or attitude of the testee when the test was given. Different test results contain these different elements in different proportions. It is possible that at some future date we shall know the proportions of some of these elements for good representative tests [1] of the various types. In the meantime, we should interpret test results with caution and should always supplement them with findings from other sources.

(5) ATTAINMENT TESTS FOR SCHOOL RECORD CARDS

The use of an intelligence test for school record cards is now generally accepted and, provided an appropriate test is used to suit pupils of different ages and capabilities,[2] the results from such tests, over a period, should provide more effective information on which to base post-primary allocation at 11+, and vocational guidance at 15+.

Similarly standardised attainment tests may be employed with benefit for internal educational guidance and for later problems of allocation. But here too the tests must be chosen with judgment to suit the age or stage of the testee. Thus while we might apply a graded word reading test with pupils up to 9+ in the junior school it is doubtful whether it is of any great value beyond that stage. On the other hand in cumulative records [3] for backward pupils in special classes it is essential that a graded word reading list should be part of the testing programme right up to the 13+ or 14+ levels.

In general there are more suitable attainment tests applicable to the junior school than to the secondary modern school, though the provision of tests for the post-primary stages is being improved. Moreover if attainment tests are to be used consistently at yearly intervals it is important that they should be adequately standardised and that parallel forms of the tests should be available.

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[1] Findings from the field of factor analysis, and from the use of analysis of variance and regression coefficients give results which if used *in conjunction* with information from other sources enable us to reveal the proportionate causal relationships of the various elements influencing a test score.

[2] Particularly in respect to the correct use of verbal tests and the need for non-verbal tests for younger or for backward pupils.

[3] We have recently included a suggested record card form for classes of backward pupils in Appendix IV, *Backwardness in the Basic Subjects*, fourth edition, 1948 (Oliver & Boyd). It is also published separately, in card form.

Thus, in a junior school, the following tests may be profitably used :—

	Chron. Ages
Reading Graded Word Recognition Test	Up to 9+ or 10+
Silent Reading Test	8+ to 11+
Graded Spelling Test	8+ to 11+
Written Arithmetic, Mechanical and Problem	7+ to 11+
Written Composition	8+ to 11+

[Tested by means of median samples on *one type* of composition.]

It is important that record cards should include objective assessments of written composition. Because of possible unreliability in the marking of composition, some education authorities have tended to omit a test of this all important ability from their examinations for post-primary allocation. This is, we consider, a weakness for no exercises with isolated words or test of grammar can replace an estimate of a pupil's ability in written composition, that is, his ability to express his ideas adequately in prose. Ability to write English is fundamental to the whole purpose of secondary education.

Research shows that unreliability in marking can be considerably reduced if four points are observed :—

(*a*) Pupils, while being given plenty of choice of topics, are required to write on *one type* of topic only. It is difficult to compare effectively English forms in the easier type of narrative descriptive writing with those used in the more difficult explanatory [1] kind of topic.

(*b*) There should be an agreed schedule for marking with appropriate proportioning of the marks between creative and mechanical aspects of the composition. Although the analytic method using a schedule is slightly more accurate [2] than general impression it is more time consuming. We would advocate the use of general impression based on a schedule for guidance. This procedure can reduce variability in marking standards, because it ensures a constant balance is preserved between the marks allowed for ideas and verbal structure and those for accuracy in the composition.

(*c*) The marking of all composition papers is done by a panel of say four to six examiners.

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[1] See *Backwardness in the Basic Subjects*, Chapter XVII for information on this topic.

[2] B.M.A. last investigated this problem "The Efficiency of Different Methods of Marking English Composition," *British Journal of Educational Psychology*, 1939, ix, and 1940, ix.

(*d*) The panel meets before marking the papers to standardise their marking on a selected number of compositions,[1] which every examiner marks every composition. There is thus information on which to assess the level of each examiner's marking compared with the average mark of the panel.

From the teachers' viewpoint the use of standardised tests not infrequently provides them with a most useful case study of the attainment of each pupil on which can be based organisation for group or sectional teaching. The results from successive applications of tests at proper intervals provide a check on the effectiveness of the methods.

From a broader viewpoint the results of standardised tests secure uniformity and give some basis for comparison of the results of particular groups of pupils with what may be considered normal or average for their age. For the headteacher the results of the tests will often be of great value in classifying pupils coming from other schools, particularly when there is a fresh intake of " new " scholars at the beginning of the school year. On the whole it is advisable to score the results of tests in terms of subject or attainment ages.

[1] Interesting information on the reliability (self-consistency) of markers is contained in *The Marking of English Essays.* P. Hartog *et al.* Macmillan, 1936. As this book goes to press a suggestive article appears in the *British Journal of Educational Psychology*, xix, November 1949, " The Marking of English Composition in Grammar School Selection," S. Wiseman. Wiseman reveals that where a panel of four markers is used, each of whom marks all compositions of the upper third of the " possible " successful entrants then a reliability coefficient for markers of ·9 has been obtained. The markers of high reliability are discovered by obtaining the correlation between critical marking of compositions and then re-marking three months later.

IV. READING TESTS

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READING TESTS

(1) *Attainment Tests*

TEST R 1.—GRADED READING VOCABULARLY TEST FOR AGES 5 TO 15

Detailed instructions for giving this test are provided in Appendix II (pages 94-99) of *The Psychology and Teaching of Reading* (Oliver and Boyd).

READING AGE

The reading age of each testee may be calculated from the following formula :—

$$\text{reading age} = \frac{\text{number of words correctly read}}{10} + 5 \text{ years.}$$

Thus if a testee reads 27 words correctly then his

$$\text{reading age} = \tfrac{27}{10} + 5 \text{ years} = 7{\cdot}7 \text{ years.}$$

If the test is commenced at a point beyond the first ten words and the testee is given credit for the earlier words care should be taken to add these on to the total score. It will be noted that results from this test are obtained in years and tenths of a year, but for recording purposes it is advisable to keep all test scores in years and months. To facilitate this conversion a table is provided on page 39.

If an estimate of the pupil's reading ability as compared with his chronological age is required we can obtain this by calculating the reading quotient.

For example, Tom S., chronological age $9\frac{7}{12}$, reads 52 words correctly, thus, reading age = 10·2 years, *i.e.* 10 years 3 months

$$\text{reading quotient} = \frac{\text{reading age}}{\text{chronological age}} \times 100$$
$$= \frac{10\frac{1}{4}}{9\frac{7}{12}} \times 100 = 107.$$

Obviously reading quotients will be below the average with dull and backward pupils and with backward readers, while in the main they will tend to be high with more able children.

Table I

CONVERSION TABLE

For converting tenths of a year into months

For converting reading and spelling ages derived from tests R 1, S 1, and S 2 in terms of years and tenths of a year into reading ages in terms of years and months.

·1 of a year = 1 month
·2 of a year = 2 months
·3 of a year = 4 months
·4 of a year = 5 months
·5 of a year = 6 months
·6 of a year = 7 months
·7 of a year = 8 months
·8 of a year = 10 months
·9 of a year = 11 months

e.g. Reading Age 8·4 = 8 years 5 months
Spelling Age 9·8 = 9 years 10 months

tree little milk egg book
school sit frog playing bun

flower road clock train light
picture think summer people something

dream downstairs biscuit shepherd thirsty
crowd sandwich beginning postage island

saucer angel ceiling appeared gnome
canary attractive imagine nephew gradually

smoulder applaud disposal nourished diseased
university orchestra knowledge audience situated

physics campaign choir intercede fascinate
forfeit siege recent plausible prophecy

colonel soloist systematic slovenly classification
genuine institution pivot conscience heroic

pneumonia preliminary antique susceptible enigma
oblivion scintillate satirical sabre beguile

terrestrial belligerent adamant sepulchre statistics
miscellaneous procrastinate tyrannical evangelical grotesque

ineradicable judicature preferential homonym fictitious
rescind metamorphosis somnambulist bibliography idiosyncrasy

TEST R 2.—SIMPLE PROSE READING TEST

This test has been constructed as an attainment test of continuous reading material for young children between the ages of 6 and 9 years, and for backward readers of any age whose reading levels fall within that 3 year range.

Accuracy of word recognition is assessed in terms of errors made. Estimates of reading comprehension can also be derived from the number of questions correctly answered after reading the prose.

Reading ages for word recognition, in terms of errors made, and for comprehension, in terms of questions answered, are given on page 44. Simple instructions for giving the test may be found on page 509 of *Backwardness in the Basic Subjects*.

In so far as the Simple Prose Test is given orally and the questions on it are answered orally there may be, for the same testees, some slight discrepancy between the results from it and the scores on a silent reading test, the answers to which are written. But this is not unexpected when we consider that the Simple Prose Test measures entirely through the oral or spoken situation while a comprehension test—such as Silent Reading Test A (pages 45-48)—measures through the silent reading-writing situation. Similar differences are sometimes found between oral or mental arithmetic and written arithmetic.

For young testees and for backward readers up to 9+ the " My Dog " comprehension scores probably give a better indication of ability to understand what is read than the written silent reading test.

Scores with equivalent reading ages are found on pages 43 and 44.

MY DOG

One day my dog cut his leg
on an open tin, so I put him
under my arm and ran to a shop.
Here a man wound some rag round the cut.
I then took my pet home
and made him lie down in a box of straw.

After three days he could put
his paw to the ground,
so we went for a short walk in the park.
At the end of a fortnight he had quite recovered
and we were able to play once again.

I am glad he is better because we like
to ramble together in the woods,
chasing grey squirrels, jumping over fallen trees
and playing hide-and-seek.

He is a very clever animal. He is able
to catch a brightly coloured ball in his mouth.
He quickly returns a stick to me
when I throw it away.
He can carry a basket between his teeth
when I go on errands for my mother
and he runs as swiftly as a hare.

QUESTIONS TO BE ASKED AFTER READING *Test R 2*

1. What did the dog cut his leg on ?
2. Where was the dog taken when he cut his leg ?
3. What did the man do to the dog's leg ?
4. What was in the box in which the dog had to lie ?
5. How long was it before the dog could put his paw to the ground ?
6. Where did the dog go for his first walk after he could put his paw to the ground ?
7. How long was it before the dog was quite well ?
8. Where do the dog and his master ramble together ?
9. What did they play in the woods ?
10. What else did they play in the woods ?
11. ,, ,, ,, ,, ,, ,, ,, ,, ?
12. What can the dog do ?
13. What else can the dog do ?
14. ,, ,, ,, ,, ,, ,, ?
15. ,, ,, ,, ,, ,, ,, ?

NORMS FOR SIMPLE PROSE READING TEST, "MY DOG"

(Reprinted from *Backwardness in the Basic Subjects*, pp. 509-510)

TABLE II

READING AGES FROM AVERAGE NUMBER OF ERRORS MADE IN THE ORAL READING OF THE TEST

READING AGE IN YEARS	AVERAGE NO. OF ERRORS MADE
Less than 6·0	More than 18
6·0	18
6·5	14
7·0	11
7·5	8
8·0	5
8·5	3
9·0	2
9·5	1

TABLE III

Simple Prose Reading Test, "My Dog"

READING AGES FOR COMPREHENSION (AS TESTED BY THE QUESTIONS ANSWERED) AND FOR SPEED

READING AGE IN YEARS	AVERAGE TIME TAKEN IN MINUTES AND SECONDS	AVERAGE NO. OF QUESTIONS ANSWERED CORRECTLY
6·0	4 minutes 45 seconds	6·0
6·5	3 ,, 16 ,,	7·0
7·0	2 ,, 51 ,,	8·0
7·5	2 ,, 38 ,,	9·0
8·0	2 ,, 6 ,,	10·0
8·5	1 ,, 35 ,,	11·0
9·0	1 ,, 28 ,,	12·0
9·5	1 ,, 18 ,,	13·0

TEST R3.

SILENT READING TEST A

[*Time—9 minutes.*]

Instructions for administering the test are given in *Backwardness in the Basic Subjects*, pp. 510-512.

Read carefully each paragraph and the question at the end of it. Write the answers to the questions on your answer paper.

(*a*) I have a cat. It is black and white. It is one year old. It sleeps in a box. It likes to play with a ball of wool.

Where does the cat sleep?

(*b*) Every now and then along the roads we see low wooden houses with tightly shut windows and little gardens stocked with flowers.

Choose the word below that tells about the windows, and write it on your answer paper:

half-open open closed apart

1. I am a wild bird. My home is in a tree. I can fly high in the air. I can sing a song.

Where is the bird's home?

2. We have a baby. When we speak to him he waves his little hand. He has ten teeth. He sleeps in a cot most of the day.

How many teeth has the baby?

3. Last Monday we went to the Zoo. We spent much time in front of an iron cage which held seven monkeys. They made us laugh when they put out their paws for nuts.

What was the monkeys' cage made of?

4. It was getting so dark that Alice thought there must be a storm coming on. " What a thick black cloud that is ! " she cried. " And how fast it comes ! Why, I do believe it's got wings."

Do you think the sun was shining ? Yes. No. Cannot tell.

5. Hans took the stone and went off with a light heart ; his eyes sparkled for joy and he said to himself, " I must have been born in a lucky hour ; everything that I wish for comes to me of itself."

Was Hans happy or unhappy ?

6. In some cities coloured lights are used to direct the cars at cross streets. A red light means " Stop," an orange light means " Get Ready," and a green light means " Go."

What light is used for " Get Ready " ?

7. There was once a shoemaker who worked very hard and was very honest, but still he could not earn enough to live on, and at last all he had in the world was gone except enough leather for one pair of shoes.

Choose the word below that tells what the shoemaker was and write it on your answer paper :

lazy dishonest hardworking proud idle

8. When a duck wants to come to rest on water it draws its head backward, tilts its body upward, thrusts its feet forward and spreads its tail outward.

Choose the word below telling how the duck places its head. Write it on your answer paper :

upward forward backward downward

9. I can skip, I go to school every day, I wear a pretty dress, I have long hair.

What am I?

10. Long ago there lived on the sea coast of Japan a young man named Yaina, a kindly fellow and clever with his rod and line.

Write the word Yaina on your answer paper. If you think he was a fisherman, put a line under his name; if you think he was not, put a cross under his name.

11. The daylight is dying
    Away in the West,
  The wild birds are flying
    In silence to rest.

Do these lines tell about evening or morning?

12. Over the meadow
    In the reeds on the shore
  Lived a mother water-rat
    And her little water-rats four.

How many water-rats altogether lived in the reeds?

13. December is a winter month in England, but in Australia it is summer at that time of the year. Christmas Day comes on 25th December.

Choose the word below which tells what Christmas Day in Australia is likely to be. Write it on your paper:

windy freezing hot cold frosty

14. A sailor dropped the captain's silver tea-pot into the sea. The captain went to the sailor and said to him, "You let my tea-pot fall into the sea, did you not? It is

lost." "No, no," said the sailor, "I know where it is. It is at the —— of the sea."

Write the word that has been left out.

15. If you are waiting on shore for a ship to come in, the first thing you see is the smoke, later the funnels and masts come in sight, and lastly the hull of the ship itself is seen.

Suppose you were watching a ship leaving the land. Choose the word below that tells you the last thing you would see. Write it on your paper :

people masts smoke funnels hull

16. Behind the little house were apple trees, a plum tree and two or three pear trees. Then came a stretch of rough grass and a stone wall with a gate leading into the pasture.

Was the stone wall in front, behind, or at the side of the house ?

17. A field mouse had a friend who lived in a house in town. Now the town mouse was asked by the field mouse to dine with him, so out he went and sat down to a meal of wheat.

Where did they dine ? At the field mouse's home, or at the town mouse's home ?

18. Upon a mountain height, far from the sea,
I found a shell,
And to my listening ear the lonely thing
Ever a song of ocean seemed to sing,
Ever a tale of ocean seemed to tell.

Which seemed to sing a song ? The mountain, the shell, or the ocean ?

TEST R 3. SILENT READING TEST A

ANSWERS

(*a*) In a box
(*b*) Closed
1. In a tree
2. Ten
3. Iron
4. No
5. Happy
6. Orange or yellow or amber
7. Hardworking
8. Backward
9. Girl
10. Yaina
11. Evening
12. Five
13. Hot
14. Bottom or Bed
15. Smoke
16. Behind
17. Field mouse's home
18. Shell

TABLE IV

TEST R 3. SILENT READING TEST A

Average Number of Questions Correct in 9 *Minutes*

BOYS

SCORE	READING AGE		SCORE	READING AGE	
	YRS.	MTHS.		YRS.	MTHS.
1	6	9	9	8	11
2	6	11	10	9	4
3	7	2	11	9	9
4	7	6	12	10	3
5	7	9	13	10	10
6	7	11	14	11	4
7	8	2	15	11	10
8	8	7	16	12	4

TABLE V

Average Number of Questions Correct in 9 *Minutes*

GIRLS

SCORE	READING AGE		SCORE	READING AGE	
	YRS.	MTHS.		YRS.	MTHS.
1	6	9	10	9	0
2	6	10	11	9	5
3	7	0	12	9	11
4	7	3	13	10	5
5	7	6	14	10	10
6	7	9	15	11	4
7	7	11	16	12	0
8	8	2	17	12	8
9	8	7	...	...	

I am indebted to Mr Downes for help in obtaining material for these revised norms.

TEST R 4.

SILENT READING TEST B

Instructions for administering the test are given in *Backwardness in the Basic Subjects*, pp. 512-513. [*Time—15 minutes.*]

Read each paragraph. You will notice that there are spaces marked with the letters A **and** B. **Write on your answer paper the one word from row** A **that will make the best sense when put in space** A, **and write on your answer paper the one word from row** B **that will make the best sense when put in space** B. **Like this :**

1. Fred had five white mice. He kept them in a tiny hutch made of wood and —— (A). One day when he went to feed the mice he found that they had gone. He looked around and found a small —— (B) in the wire.

(A) bread, sand, wire, leaves, paper.
(B) pot, nut, pole, stick, hole.

2. They came to the church tower, and all the crows flew out in fright. " Caw ! Caw ! " they cried. " Go away ! You must not peep in at our ——" (A).

And then Tom and his friend went high, high up in the balloon till the church looked as small as a Noah's Ark and the sheep and the cows were like dots on the —— (B).

(A) game, hat, nests, books, dinner.
(B) plate, river, house, trees, fields.

3. One day a poor fisherman was casting his net into the sea, hoping to catch some —— (A). As he pulled in his net he saw in it a small glass bottle, but no fish. He picked up the —— (B) and looked at it. It seemed to be quite empty.

(A) wood, fruit, seaweed, fish, shells.
(B) fish, rope, bottle, stick, shell.

4. The king had just had a good sleep, for it was a hot day ; and now he drank a cup of coffee and smoked a long pipe, and was happy.

His chief servant came in, and crossing his —— (A) upon his breast bowed low before him.

" Sir," he said, " there is a pedlar outside, and he has many costly things in his pack."

" Bring him in at once," said the —— (B).

(A) feet, flowers, pipe, head, hands.
(B) servant, man, pedlar, king, boy.

5. Just then the moon came out, and they saw an owl perched up on a beam, and wiping the tears from her great, brown eyes. " Why do you weep ? " asked the king.

" I am so ——" (A), said the owl. " I am not really a bird, but a princess. A wicked man gave me a magic drink which changed me into an ——" (B).

(A) happy, long, fat, sad, glad.
(B) sparrow, woman, owl, man, beam.

6. A boy's name was Ross Smithson, so that each time he wrote his name he would write altogether —— (A) letters, and of these letters —— (B) of them would be the letter S.

(A) eight, ten, eleven, nine, twelve.
(B) two, five, three, four, six.

7. A boy was once fishing, and he had by his side a very large can in which to put the fish he caught. So far he had caught nothing. A man who was passing saw that the lad had a bite and waited to see whether he would bring the fish to land or not. He said to the boy, " How many fish have you caught, Tommy ? " The boy replied : " When I have caught this —— (A) and —— (B) more I shall have three."

(A) cold, one, line, two, worm.
(B) bites, two, three, one, fish.

8. The big Polar Bear, which lived among the cold, snowy forest trees, hated the fire and the people who had it. He was greedy and wanted the North land all for —— (A), and he watched for a chance of putting out their —— (B).

(A) nothing, morning, himself, playing, others.
(B) fire, food, clothes, home, garden.

9. A pair of sparrows had built their nest in a hollow place near the top of a chimney. The wind sometimes blew the —— (A) about them ; but they did not mind that much for most of the day they spent in the

streets below, chasing one another, peeping in at shop windows, or picking up crumbs from the village —— (B).

(A) leaves, stones, clouds, smoke, food.
(B) plates, streets, chimneys, roofs, trees.

10. In Paris, in the old days, it was quite common to find very rich and very poor people living near to each other. In a large building the underground rooms might be rented by the very —— (A) while in the large chambers above, where there was plenty of air and light, might live people who were very —— (B) indeed.

(A) rich, poor, old, fat, tired.
(B) poor, happy, rich, young, hungry.

11. Hundreds of years ago it was the custom for young men and women to go before daybreak on the first of May to a wood near at hand ; some played music and some blew horns as they walked to the wood. They broke down branches of trees and gathered flowers. When they returned home about sunrise they decked their houses with the —— (A) and flowers. They spent the afternoon dancing around the Maypole which was placed in a suitable part of the village and which stood there until next —— (B).

(A) ribbons, paint, nuts, branches, flags.
(B) autumn, winter, October, holiday, May.

12. A farmer visiting the National Gallery stopped before a portrait of a man sitting in a high-backed chair. On a card at the foot of the picture the farmer read these words : " A portrait of Edward Jefferies, by himself." The old fellow laughed to himself, saying, " How foolish these city people are. Anybody looking at that picture would know that Jefferies was by —— (A). There isn't anyone in the——(B) with him."

(A) an artist, chair, himself, portrait, light.
(B) picture, gallery, farm, name, chair.

13. Birds travelling long distances usually fly at night and are attracted by the bright lamps of lighthouses. In the past, thousands of birds have been killed by dashing themselves against the thick glass. Nowadays, many of our lighthouses have been fitted with special frames on which the —— (A) perch and rest, and this has saved the —— (B) of countless numbers of birds.

(A) lights, sailors, birds, storm, fish.
(B) lives, ships, wings, flight, homes.

14. Two friends were travelling on the same road together when they met a bear. The one, in great fear, without a single thought of his companion, climbed up into a tree and hid himself. The other, seeing that he had no chance single-handed against the bear, had —— (A) left but to throw himself on the ground and feign to be dead :

for he had heard that a bear will never touch a dead —— (B). As he thus lay the bear came up to his head, muzzling and sniffing at his nose and ears; but the man held his —— (C) and the bear, supposing him to be dead, walked away.

(A) nothing, something, only, perhaps, neither.
(B) fly, leap, body, horse, orange.
(C) hand, paw, coat, gun, breath.

15. When the bear was fairly out of sight, his companion came down out of the tree and asked what it was that the bear whispered to him, "For," said he, "I observed that he put his mouth very close to your ear."

"Why," replied the other, "it was no great secret; he only bade me beware how I kept company with those who, when they get into a —— (A) leave their —— (B) to look after themselves."

(A) stream, difficulty, house, train, road.
(B) money, pupils, goods, friends, horses.

16. The sailors who manned Cæsar's ships, too, made a mistake. There being a full moon and a Spring tide, the ships that he had grounded (for easier landing for his soldiers) were caught, badly anchored, by the rising —— (A) and several were dashed against each other and —— (B).

(A) moon, soldiers, sun, fields, tide.
(B) saved, painted, helped, lost, found.

17. So long as icebergs sail over deep water they move freely about as the currents or winds may drive them. But when they get into water shallow enough to allow their bottoms to grate along the sea floor, they tear up the mud or sand there until they are at last stranded. The coast of Labrador is often fringed with such grounded icebergs, some so small as to be driven on to the —— (A), others so large as to run aground while still a long —— (B) from the shore.

(A) pier, fields, beach, streets, rivers.
(B) miles, view, ship, rope, way.

18. The flowers of the hop plants are collected and taken to the "oast house" or kilns to be dried. The oast house is shaped like a cone. At the top there is a big black funnel of tin which swings round in such a way as to prevent the wind blowing in the hole at the top of the cone. Inside the oast house the hops are dried on wire netting above a furnace. While they are —— (A) they must be turned over and over or they would be —— (B).

(A) boiling, drying, smouldering, cooking, raining.
(B) ripe, soft, wet, clean, spoiled.

19. Cotton goods cannot be made in every place. For spinning and weaving cotton well there must be moist air, plenty of water and plenty of coal. If the air is dry, the

cotton threads snap when they are tightly stretched. The south-west winds which blow across Lancashire are moist or wet winds. They keep the air —— (A) so that —— (B) can be easily spun and —— (C).

(A) hot, dry, warm, moist, cool.
(B) wool, plants, rope, clothes, cotton.
(C) sold, woven, bought, coloured, worn.

20. One day we were becalmed among a group of small islands, most of which appeared to be uninhabited. As soon as we were in want of fresh water, the Captain sent the boat ashore to bring off a cask or two. But we were mistaken in thinking there were no natives, for scarcely had we drawn near to the shore when a band of —— (A) rushed out of the bush and assembled on the beach, brandishing their clubs and spears in a threatening —— (B).

(A) pigs, animals, savages, pirates, horses.
(B) wave, manner, help, yell, speech.

TEST R 4. SILENT READING TEST B

ANSWERS

1A	wire
B	hole
2A	nests
B	fields
3A	fish
B	bottle
4A	hands
B	king
5A	sad
B	owl
6A	twelve
B	four
7A	one
B	two
8A	himself
B	fire
9A	smoke
B	streets
10A	poor
B	rich
11A	branches
B	May
12A	himself
B	picture
13A	birds
B	lives
14A	nothing
B	body
C	breath
15A	difficulty
B	friends
16A	tide
B	lost
17A	beach
B	way
18A	drying
B	spoiled
19A	moist
B	cotton
C	woven
20A	savages
B	manner

Note on the Use of Silent Reading Test B with Older Pupils Backward in Reading

For small groups of senior pupils (11+ to 16) who are backward in reading it is useful to allow them first to do the test observing the given time limit and then to encourage them to complete the entire test, recording the time as each testee finishes. A comparison of the results in terms of errors made, amount covered in given time and time taken to complete the test yields suggestive information on the type of silent reading exercises that might profitably be given to improve both accuracy and speed.

Table VI

TEST R 4. SILENT READING TEST B

Average Number of Questions Correct in 15 *Minutes*

Boys

Score	Yrs.	Mths.	Score	Yrs.	Mths.	Score	Yrs.	Mths.	Score	Yrs.	Mths.
1	6	8	11	8	4	21	10	1	31	11	11
2	7	0	12	8	5	22	10	4	32	12	1
3	7	2	13	8	7	23	10	6	33	12	3
4	7	4	14	8	9	24	10	8	34	12	6
5	7	6	15	8	11	25	10	10	35	12	9
6	7	8	16	9	1	26	11	0	36	13	0
7	7	9	17	9	4	27	11	2	37	13	3
8	7	10	18	9	6	28	11	4	38	13	6
9	7	11	19	9	8	29	11	7	39	13	9
10	8	2	20	9	10	30	11	9	...	...	...

Table VII

TEST R 4. SILENT READING TEST B

Average Number of Questions Correct in 15 *Minutes*

Girls

Score	Yrs.	Mths.	Score	Yrs.	Mths.	Score	Yrs.	Mths.	Score	Yrs.	Mths.
1	6	7	11	8	0	21	9	10	31	11	8
2	6	11	12	8	1	22	10	1	32	11	11
3	7	0	13	8	3	23	10	3	33	12	1
4	7	2	14	8	5	24	10	5	34	12	4
5	7	4	15	8	7	25	10	7	35	12	7
6	7	5	16	8	10	26	10	9	36	12	10
7	7	6	17	9	1	27	10	11	37	13	1
8	7	7	18	9	3	28	11	2	38	13	4
9	7	8	19	9	5	29	11	4	39	13	7
10	7	10	20	9	7	30	11	6	...	...	...

(2) *Diagnostic Reading Tests*

TEST R 5 (DIAGNOSTIC TEST)

Test of Analysis and Synthesis of Words Containing Common Phonic Units

Instructions for the test are given in Appendix I, p. 514, of *Backwardness in the Basic Subjects*

This is a diagnostic test of graded words containing most of the common phonic combinations and families. Use of the test enables the examiner to estimate the backward reader's power of analysing words into their usual phonic constituents and of recombining these to make word wholes. The test provides the teacher or psychologist with comparatively exact and comprehensive information on each backward reader's knowledge of phonics, and thus he is able to judge to what extent the disability is due in part to a weakness in this aspect of the reading process. He is thereby enabled to plan the nature and the amount of phonic instruction required by each pupil. The test will reveal that some backward readers require a complete and continuous systematic course of phonic teaching while others want help with only a few particular phonic families.

TEST R 5

nip
gum
mud
mop
fish
ground

get
van
cow
fir
dress
train

rod
win
boy
our
will
duck

beg
dug
buy
yes
grew
spell

had
let
say
her
from
clock

bright
hear
nose
bone
road
goat

sing
dove
lock
keep
book
thief

gate
find
past
crawl
boil
they

bark
stick
sold
fine
pool
torn

meat
hurt
blue
rail
cried
which

duster
thunder
fishing
darkness
glittering
wonderful

winter
market
farmyard
whenever
something
important

until
pocket
helpful
broken
harvest
pretend

forget
lifted
empty
remembered
understood
inviting

began
sunset
holiday
contented
catching
refreshment

TEST R 6

Test of Directional Attack on Words

Instructions for the test are given in Appendix I, p. 514, of *Backwardness in the Basic Subjects*

Read down

bed
dig
bad
boy
pot
pit
top
got
sad
put
stop
lap
who
now
whose
how

of
for
from
ton
on
to
dog
no
rag
gas
push
what
saw
wash
was
raw

men
new
wet
tar
job
do
tub
sit
every
yes
very
never
pig
quite
leap
felt

TEST R 7

Visual Word Discrimination test

Instructions for administering the test are given in Appendix I, p. 515, of *Backwardness in the Basic Subjects*

1. thred	thraed	threab	threed	thread	threard
2. peices	pices	qieces	pieces	pieses	piesese
3. mho	how	wha	whos	who	ho
4. donw	dawn	down	drown	dow	dowm
5. plaiy	lay	paly	plag	pley	play
6. thre	thrie	there	three	these	theree
7. babies	babees	babes	babeis	babiese	badies
8. siad	sed	saide	saed	said	sad
9. dunger	dager	danqer	danger	dranger	gander
10. forom	fram	fron	fom	form	from
11. bosket	barkset	basket	bashet	baket	bakset
12. touches	torche	tonches	torhces	tarches	torches
13. tewlev	twelve	twleve	tewle	tewelve	twilve
14. finger	finsger	fingir	fringe	figer	finges
15. barnt	bunt	brunt	burnt	blurnt	lurnt
16. pucture	pictur	pitcure	picture	pictare	piclure
17. vevlet	velet	vevlete	velvit	velvet	velnet
18. sings	sinq	sing	sig	snig	sang
19. crages	crays	cargs	crugs	crags	crag
20. teech	tech	taech	treach	teack	teach
21. potch	porch	patech	path	patch	patck
22. hasband	husband	husban	hasbund	husdband	husdand
23. statne	sattue	stactue	stetue	statue	staue
24. aftermoon	aternfoon	afturnoon	afterrnoon	afternoon	afteroon
25. marbe	marble	mrabel	murble	mardle	mareble

V. SPELLING TESTS

There are two attainment tests in spelling,[1] for an age range 5 to 15 years, namely :—

S 1.—Graded Word Spelling Test A
S 2.—Graded Word Spelling Test B

These two tests are of comparable difficulty and provide comparable estimates of a pupil's attainment in spelling.

INSTRUCTIONS FOR ADMINISTERING THE TESTS

The test can be given to a single testee or to a group of testees. The words are dictated by the examiner and written on paper by the pupils. To aid the testees in knowing the word to be written *each word is first dictated*, next embedded in *an explanatory sentence* and then *dictated again*. Thus the first two words in Test A would be treated somewhat as follows :—

"Net. The fish was caught in a *net*. Write *net*."
"Can. *Can* you do this ? Write *can*."

The examiner should speak slowly and carefully being sure not to clip final letters nor to slur intermediate syllables. If children who use a particular dialect are being examined by a person whose speech approximates to standard English, then he should make certain that pupils understand fully words where there is any dialectic difference between their speech and that of the examiner.

WRITING OF TEST BY PUPILS

Pupils should write the words in groups of five *across* the page of paper, *i.e.* along the lines, not down. Thus on each line there should be only five words. This form of setting out aids in marking and in the calculation of spelling age.

The aim in giving the test is to find out how many of the words the pupil can spell correctly. Thus young pupils and backward spellers should commence with the first word of the test. Older or more able pupils should commence with a group of words, approximately two years below their chronological age, assuming that the first 10 words of each test are for 5-6 year old pupils, the next 10 words for 6-7 year old pupils, the next 10 words for 7-8 year old pupils and so on. Thus an average class of pupils of 10-11 year olds with a few bright 9 year olds or duller 11 year olds in it should commence with the 8-9 group of words (*e.g.* in Test A the group of words starting with "ground"). Pupils should continue writing words until they fail with

---

[1] The Kent Spelling Tests were used as a basis for the construction of Tests S1 and S2, and I am grateful to the Kent Education Committee for this co-operation.

8 to 10 consecutive words. At this point they should discontinue, as the words are graded in order of increasing difficulty.

In testing a single pupil it is quite easy to determine when he should discontinue the test, but in testing a class or a group of pupils it is necessary for the examiner to walk round the class glancing at the written words of each pupil. He should advise particular pupils in turn to cease writing when their errors show that they have reached the limit of their orthographic accuracy. With able pupils it is important to make quite sure that we have reached the limit of their spelling powers by continuing the test to sufficient limits. Bright pupils will not infrequently have successes scattered sporadically over three or four groups well in advance of their chronological ages.

SCORING

Each testee's result on the test can be scored in the form of a spelling age from the following formula :—

$$\text{Spelling age} = \frac{\text{number of words correctly spelled}}{10} + 5 \text{ years}$$

thus 39 words right = S.A. of $\frac{39}{10}+5 = 8{\cdot}9$ years.

If the test is commenced at a group of words beyond the initial one, care should be taken to add to the total score the number of words in prior groups which were not written, as it is then assumed that the testee(s) could spell the words omitted from the earlier and easier group(s).

It should also be remembered that the results of these tests (Tests S 1 and S 2) in terms of spelling ages are in years and tenths of a year and need to be converted into years and months for record purposes.[1]

SPELLING QUOTIENT

Should an estimate of the pupil's spelling attainments compared with his chronological age be required, this can be obtained by calculating the spelling quotient.

$$\text{Spelling quotient} = \frac{\text{spelling age}}{\text{chronological age}} \times 100.$$

For example, Tom S., age $9\frac{7}{12}$ spells 43 words correctly, thus, his spelling age (S.A.) = 9·3 years or 9 years 4 months.

$$\text{Spelling quotient} \left(\frac{\text{S.A.}}{\text{C.A.}} \times 100\right) = \frac{9\frac{4}{12}}{9\frac{7}{12}} \times 100 = 97.$$

---

[1] See Conversion Table on p. 39.

S 1. GRADED WORD SPELLING TEST A

net sat	can hit	fun lid	top cap	rag had
let may	doll tree	bell by	yes ill	then egg
land flower	how son	your seem	cold four	talk loud
ground noise	lowest remain	brain hoped	write worry	amount dancing
damage fitted	else spare	through daughter	entered edge	cough search
concert avoid	domestic duties	topic recent	method type	freeze instance
liquid description	assist welfare	readily various	guess genuine	attendance interfere
accordance approval	mechanical accomplished	anxious remittance	signature financial	allotment capacity
surplus prologue	exceptionally colonel	successful coarse	preliminary referring	resource courteous
exhibition definite	affectionately guarantee	attorney anniversary	pinnacle irresistible	toboggan hydraulic

S 2. GRADED WORD SPELLING TEST B

see	cut	mat	in	ran
bag	ten	hat	dad	bed
leg	dot	pen	yet	hay
good	till	be	with	from
time	call	help	week	pie
boat	mind	sooner	year	dream
sight	mouth	large	might	brought
mistake	pair	while	skate	stayed
yoke	island	nerve	join	fare
iron	health	direct	calm	headache
final	circus	increase	slippery	lodge
style	bargain	copies	guest	policy
view	library	cushion	safety	patient
account	earliest	institution	similar	generous
orchestra	equally	individual	merely	enthusiastic
appreciate	familiar	source	immediate	breathe
permanent	sufficient	broach	customary	especially
materially	cemetery	leisure	accredited	fraternally
subterranean	apparatus	portmanteau	politician	miscellaneous
mortgage	equipped	exaggerate	amateur	committee

VI. TESTS OF ARITHMETIC

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TESTS OF ARITHMETIC

(1) *Attainment Tests*

Essential Mechanical Arithmetic Test, Form A For ages 7+ to 12+ years	Time 30 minutes
Essential Mechanical Arithmetic Test, Form B For ages 7+ to 12+ years	Time 30 minutes
Essential Problem Arithmetic Test, Form A For ages 7+ to 14+ years	Time 30 minutes
Essential Problem Arithmetic Test, Form B For ages 7+ to 14+ years	Time 30 minutes

(2) *Diagnostic Arithmetic Tests*

Test 1. Addition Combinations
Test 2. Subtraction Combinations
Test 3. Multiplication Combinations
Test 4. Division Combinations
Test 5. Miscellaneous
Test 6. Graded Addition
Test 7. Graded Subtraction
Test 8*a*. Graded Multiplication
Test 8*b*. Graded Multiplication (Compound)
Test 9. Graded Division (Simple)
Test 10. Graded Long Division (Easy Steps)
Test 11. Graded Long Division (Harder Steps)
Test 12. Graded Mental Arithmetic

(1) Attainment Tests

THE Essential Arithmetic Tests set out in the following pages are primarily attainment tests for estimating levels of attainment in mechanical and problem arithmetic. In the main the mechanical tests are applicable to children in primary schools but they may be used for more backward pupils in secondary modern schools. They will also be useful to the teacher or educational psychologist who requires a quick but accurate estimate of the arithmetical knowledge of new entrants to a school, of members of a special class for backward pupils or of children referred to a Child Guidance Clinic.

The two parallel forms of each test make the material suitable for record card purposes, for which Form B of each test can be used alternately with Form A to reduce practice effects that sometimes accrue from the use of the same arithmetic test on successive occasions.

Short Instructions for Essential Arithmetic Tests

The instructions on the cover page of each test should be read aloud carefully and slowly by the examiner to the testees. The only other instruction when doing the mechanical arithmetic tests is to advise the pupils that in the booklets division sums are set out like this $8\overline{)84}$ (write this on the blackboard), so that the answers can be put above the line. Pupils should be told that if they are used to doing division sums with the line along the bottom of the sum like this $8)\underline{84}$ (write this on the blackboard), so that answers can be written underneath, then they can simply draw a line along the bottom of the sum and put their answers underneath as they usually do.

The time limit of 30 minutes for each test should be carefully observed. Begin timing when testees commence the first sum, and see that they turn over to new pages without delay.

Norms for the tests are given on page 105.

Answers for the tests are given on these pages: Mechanical Test (Form A), page 78; Mechanical Test (Form B), page 86; Problem Test (Form A), page 95; Problem Test (Form B), page 96.

Interpretation of the results are to be found in chapter III.

Suggestions for materials linked with the results are given on pages 163-164.

FORM A

THE ESSENTIAL MECHANICAL ARITHMETIC TEST

FOR PUPILS 7+ TO 12+

Name..

Boy or Girl..

Your Age...

Date of Birthday...

Class...

School...

....

FOR THE TEACHER	
Page 1	
Page 2	
Page 3	
Page 4	
Page 5	
Page 6	
TOTAL SCORE . .	
Actual age in years and completed months	
Arithmetic age .	

READ THIS CAREFULLY

1. Do the sums in this booklet as carefully and as quickly as you can.
2. There are different kinds of sums. **Look for the sign to tell you what to do.**
3. Write your answers in the place left for them. Do all the working you want on this paper.
4. If you can't do a sum leave it and go on with the next. When you finish one page go on to the next page **without waiting.**
5. The first sums are easy, then they get harder, but no one is expected to do everything. Just do your best.
6. You have 30 minutes. **You must not ask questions.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

(Page 1)

Look carefully to see whether the sum is an add +, subtract —, multiply ×, or divide ÷ sum. Work across the page.

1.

Add

$3+8=$

2.

Add

$$\begin{array}{r} 4\;4 \\ +\;5\;3 \\ \hline \\ \hline \end{array}$$

3.

Add

$$\begin{array}{r} 6\;7 \\ +\;9\;8 \\ \hline \\ \hline \end{array}$$

4.

Subtract

$15-6=$

5.

Subtract

$$\begin{array}{r} 7\;9 \\ -\;4\;4 \\ \hline \\ \hline \end{array}$$

6.

Subtract

$$\begin{array}{r} 9\;2 \\ -\;4\;7 \\ \hline \\ \hline \end{array}$$

7.

Multiply

$4\times 8=$

8.

Multiply

$$\begin{array}{r} 9\;3 \\ \times\;3 \\ \hline \\ \hline \end{array}$$

9.

Multiply

$$\begin{array}{r} 5\;4 \\ \times\;7 \\ \hline \\ \hline \end{array}$$

10.

Divide

$36\div 4=$

11.

Divide

$3\overline{)6\;\;3}$

12.

Divide

$6\overline{)1\;\;0\;\;2}$

(Page 2)

Work across the page

13.

Add

$$\begin{array}{r} 4\ 2\ 6 \\ 3\ 3\ 7 \\ +9\ 4\ 9 \\ \hline \\ \hline \end{array}$$

14.

Subtract

$$\begin{array}{r} 8\ 2\ 5 \\ -\,2\ 4\ 8 \\ \hline \\ \hline \end{array}$$

15.

Multiply

$$\begin{array}{r} 3\ 5\ 7 \\ \times\ 8 \\ \hline \\ \hline \end{array}$$

16.

Divide

$$8\overline{)2\ 0\ 8}$$

17.

Add

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 5 & 7 \\ +3 & 8 \\ \hline \\ \hline \end{array}$$

18.

Add

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 2 & 11\tfrac{3}{4} \\ & 4\tfrac{3}{4} \\ 1 & 3\tfrac{1}{2} \\ +3 & 9\tfrac{1}{2} \\ \hline \\ \hline \end{array}$$

19.

Subtract

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 10 & 4 \\ -4 & 9 \\ \hline \\ \hline \end{array}$$

20.

Multiply

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 3 & 8 \\ & \times 5 \\ \hline \\ \hline \end{array}$$

21.

Divide

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 4\overline{)4} & \overline{6} \end{array}$$

22.

Divide

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 6\overline{)1\ 3} & \overline{6} \end{array}$$

(Page 3)

Work across the page and put your working on the page

23.

Subtract

£	s.	d.
6	3	5
−4	16	10½

24.

Add

£	s.	d.
3	18	6¼
8	4	10½
+1	3	9½

25.

Multiply

£	s.	d.
3	9	7¾
		×4

26.

Divide

	£	s.	d.
5)	7	11	3

27.

Multiply

weeks	days
3	6
	×6

28.

Subtract

lbs.	ozs.
6	13
−2	15

29.

Divide

	yds.	ft.
8)	34	2

30.

Divide

12)36672

31.

Multiply

846
× 79

(Page 4)

Work across the page and put your working on the page

32.

Divide

$86\overline{)69402}$

33.

Multiply

£	s.	d.
12	16	6½
		×14

34.

Divide

$$17\overline{)\begin{array}{ccc} \pounds & s. & d. \\ 55 & 14 & 11 \end{array}}$$

35, 36.

Pay this bill and find the change from 12s. 6d.

	£	s.	d.
3 lbs. currants at 9d. per lb. . .			
1½ lb. coffee at 2s. 8d. per lb. . .			
1¾ lb. margarine at 1s. 4d. per lb. .			
7 eggs at 2s. 6d. per dozen . . .			
Paid			
Gave shopkeeper . .	0	12	6
Change			

(Page 5)

Work across the page and put your working on the page

37.

Add

$\frac{2}{3}+\frac{5}{6}$

38.

Subtract

$\frac{3}{4}-\frac{2}{3}$

39.

Add

$3\frac{2}{3}+2\frac{4}{5}$

40.

Subtract

$2\frac{1}{5}-1\frac{5}{6}$

41.

Multiply

$\frac{3}{10}\times\frac{5}{6}$

42.

Divide

$\frac{3}{4}\div\frac{5}{6}$

43.

£ $3\frac{3}{5}+2\frac{3}{4}-2\frac{1}{2}$. Answer in £, s. d.

44.

Add

Add 55·5, 6·01, 19·042 and seven hundredths.

(Page 6)

45.

Subtract

$$\begin{array}{r} 15\cdot1012 \\ -9\cdot0186 \\ \hline \\ \hline \end{array}$$

46.

Multiply

$$\begin{array}{l} 3\cdot8964 \\ \times\ \cdot6 \\ \hline \\ \hline \end{array}$$

47.

$49\cdot707 \div \cdot7$

48.

$62\cdot78 \div 4\cdot3$

49.

	s.	d.
Find 25 per cent. of	12	6

50.

	£	s.
Find 40 per cent. of	5	10

ANSWERS

MECHANICAL ARITHMETIC TEST, FORM A

1. 11
2. 97
3. 165
4. 9
5. 35
6. 45
7. 32
8. 279
9. 378
10. 9
11. 21
12. 17
13. 1712
14. 577
15. 2856
16. 26
17. 9s. 3d.
18. 8s. 5½d.
19. 5s. 7d.
20. 18s. 4d.
21. 1s. 1½d.
22. 2s. 3d.
23. £1, 6s. 6½d.
24. £13, 7s. 2¼d.
25. £13, 18s. 7d.
26. £1, 10s. 3d.
27. 23 wks. 1 day
28. 3 lbs. 14 ozs.
29. 4 yds. 1 ft.
30. 3056
31. 66,834
32. 807
33. £179, 11s. 7d.
34. £3, 5s. 7d.

35, 36. £	s.	d.
	2	3
	4	0
	2	4
	1	5½
	10	0½

Change : 2s. 5½d.

37. 1½
38. $\frac{1}{12}$
39. $6\frac{7}{15}$
40. $\frac{11}{30}$
41. ¼
42. $\frac{9}{10}$
43. $3\frac{17}{20}$ £3, 17s.
44. 80·622
45. 6·0826
46. 2·33784
47. 71·01
48. 14·6
49. 3s. 1½d.
50. £2, 4s. 0d.

FORM B

THE ESSENTIAL MECHANICAL ARITHMETIC TEST

FOR PUPILS 7+ TO 11+

Name ....

Boy or Girl...

Your Age ....

Date of Birthday...

Class ....

School ....

....

FOR THE TEACHER	
Page 1	
Page 2	
Page 3	
Page 4	
Page 5	
Page 6	
TOTAL SCORE . .	
Actual age in years and completed months	
Arithmetic age .	

READ THIS CAREFULLY

1. Do the sums in this booklet as carefully and as quickly as you can.
2. There are different kinds of sums. **Look for the sign to tell you what to do.**
3. Write your answers in the place left for them. Do all the working you want on this paper.
4. If you can't do a sum leave it and go on with the next. When you finish one page go on to the next page **without waiting.**
5. The first sums are easy, then they get harder, but no one is expected to do everything. Just do your best.
6. You have 30 minutes. **You must not ask questions.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

(Page 1)

Look carefully to see whether the sum is an add +, subtract −, multiply ×, or divide ÷ sum. Work across the page.

1.

Add

$5+6=$

2.

Add

$$\begin{array}{r} 4\ 3 \\ +\ 5\ 5 \\ \hline \\ \hline \end{array}$$

3.

Add

$$\begin{array}{r} 4\ 7 \\ +\ 8\ 8 \\ \hline \\ \hline \end{array}$$

4.

Subtract

$15-9=$

5.

Subtract

$$\begin{array}{r} 8\ 9 \\ -\ 3\ 4 \\ \hline \\ \hline \end{array}$$

6.

Subtract

$$\begin{array}{r} 9\ 1 \\ -\ 4\ 4 \\ \hline \\ \hline \end{array}$$

7.

Multiply

$3\times9=$

8.

Multiply

$$\begin{array}{r} 7\ 1 \\ \times\ 5 \\ \hline \\ \hline \end{array}$$

9.

Multiply

$$\begin{array}{r} 6\ 4 \\ \times\ 7 \\ \hline \\ \hline \end{array}$$

10.

Divide

$32\div4=$

11.

Divide

$3\overline{)9\ 3}$

12.

Divide

$6\overline{)1\ 0\ 8}$

(Page 2)

Work across the page

13.

Add

$$\begin{array}{r} 4\ \ 1\ \ 8 \\ 3\ \ 5\ \ 6 \\ +9\ \ 4\ \ 9 \\ \hline \\ \hline \end{array}$$

14.

Subtract

$$\begin{array}{r} 7\ \ 1\ \ 5 \\ -3\ \ 3\ \ 8 \\ \hline \\ \hline \end{array}$$

15.

Multiply

$$\begin{array}{r} 3\ \ 7\ \ 9 \\ \times\ 8 \\ \hline \\ \hline \end{array}$$

16.

Divide

$$8)\overline{1\ \ 8\ \ 4}$$

17.

Add

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 3 & 5 \\ +5 & 8 \\ \hline \\ \hline \end{array}$$

18.

Add

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 2 & 11\frac{3}{4} \\ & 5\frac{1}{2} \\ 1 & 8\frac{1}{4} \\ +4 & 3\frac{1}{4} \\ \hline \\ \hline \end{array}$$

19.

Subtract

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 8 & 1 \\ -3 & 5 \\ \hline \\ \hline \end{array}$$

20.

Multiply

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 2 & 6 \\ & \times 5 \\ \hline \\ \hline \end{array}$$

21.

Divide

$$\begin{array}{rr} & \text{s.}\quad\ \ \text{d.} \\ 4) & \overline{4\quad\ \ 10} \end{array}$$

22.

Divide

$$\begin{array}{rr} & \text{s.}\qquad \text{d.} \\ 6) & \overline{14\qquad 6} \end{array}$$

(Page 3)

Work across the page and put your working on the page

23.

Subtract

£	s.	d.
5	5	2
−2	14	10½

24.

Add

£	s.	d.
3	16	4½
8	2	11¼
+1	2	7¾

25.

Multiply

£	s.	d.
4	8	9¾
		×3

26.

Divide

	£	s.	d.
7)	9	17	9

27.

Multiply

weeks	days
4	5
	×6

28.

Subtract

lbs.	oz.
8	11
—3	14

29.

Divide

	yds.	ft.
7)	51	1

30.

Divide

12)48756

31.

Multiply

683
× 89

(Page 4)

Work across the page and put your working on the page

32.

Divide

79)63674

33.

Multiply

£	s.	d.
13	16	7½
		×14

34.

Divide

	£	s.	d.
17)	62	19	5

35, 36.

Pay this bill and find the change from 13s. 6d.

	£	s.	d.
3 lbs. prunes at 10d. per lb. . . .			
2½ lbs. tea at 1s. 6d. per lb. . .			
1¾ lb. butter at 2s. 4d. per lb. . .			
9 lemons at 2s. 6d. per dozen . .			
Paid			
Gave shopkeeper . .	0	13	6
Change			

(Page 5)

Work across the page and put your working on the page

37.

Add

$\frac{3}{4}+\frac{7}{8}$

38.

Subtract

$\frac{2}{3}-\frac{1}{4}$

39.

Add

$4\frac{3}{8}+1\frac{4}{5}$

40.

Subtract

$3\frac{1}{5}-1\frac{4}{7}$

41.

Multiply

$\frac{5}{8}\times\frac{2}{5}$

42.

Divide

$\frac{3}{12}\div\frac{5}{6}$

43.

£ $2\frac{2}{5}+3\frac{1}{2}-2\frac{1}{4}$. Answer in £, s. d.

44.

Add

Add 67·7, 6·03, 15·023
and nine hundredths.

(Page 6)

45.

Subtract

$$\begin{array}{r} 18\cdot1013 \\ -9\cdot0278 \\ \hline \\ \hline \end{array}$$

46.

Multiply

$$\begin{array}{l} 6\cdot7849 \\ \times\cdot7 \\ \hline \\ \hline \end{array}$$

47.

$45\cdot909 \div \cdot9$

48.

$64\cdot78 \div 4\cdot1$

49

	s.	d.
Find 25 per cent. of	17	6

50

	£	s.
Find 60 per cent. of	5	10

ANSWERS

Mechanical Arithmetic Test, Form B

1. 11
2. 98
3. 135
4. 6
5. 55
6. 47
7. 27
8. 355
9. 448
10. 8
11. 31
12. 18
13. 1723
14. 377
15. 3032
16. 23
17. 9s. 1d.
18. 9s. $4\frac{3}{4}$d.
19. 4s. 8d.
20. 12s. 6d.
21. 1s. $2\frac{1}{2}$d.
22. 2s. 5d.
23. £2, 10s. $3\frac{1}{2}$d.
24. £13, 1s. $11\frac{1}{2}$d.
25. £13, 6s. $5\frac{1}{4}$d.
26. £1, 8s. 3d.
27. 28 wks. 2 days
28. 4 lbs. 13 ozs.
29. 7 yds. 1 ft.
30. 4063
31. 60787
32. 806
33. £193, 12s. 9d.
34. £3, 14s. 1d.

35, 36.

£	s.	d.
	2	6
	3	9
	4	1
	1	$10\frac{1}{2}$
	12	$2\frac{1}{2}$

Change : 1s. $3\frac{1}{2}$d.

37. $1\frac{5}{8}$
38. $\frac{5}{12}$
39. $6\frac{7}{40}$
40. $1\frac{22}{35}$
41. $\frac{1}{4}$
42. $\frac{3}{10}$
43. $3\frac{13}{20}$ £3, 13s.
44. 88·843
45. 9·0735
46. 4·74943
47. 51·01
48. 15·8
49. 4s. $4\frac{1}{2}$d.
50. £3, 6s. 0d.

FORM A

THE ESSENTIAL PROBLEM ARITHMETIC TEST

FOR PUPILS 7+ TO 14+

Name ....

Boy or Girl ....

Your Age ....

Date of Birthday..

Class ....

School..

....

FOR THE TEACHER	
Page 1	
Page 2	
Page 3	
Page 4	
Page 5	
Page 6	
Page 7	
TOTAL SCORE . .	
Actual age in years and completed months	
Arithmetic age .	

READ THIS CAREFULLY

1. Do the sums in this booklet as carefully and as quickly as you can.
2. Some of the sums are very easy. You can work them in your head and just write the answer on the dotted line at the right of the sum.
3. If you can't do a sum in your head work it out in the space near the sum. Do all the working you want on this paper.
4. If you can't do a sum leave it and go on with the next. When you finish one page go on to the next page **without waiting**.
5. The first sums are easy, then they get harder, but no one is expected to do everything. Just do your best.
6. You have 30 minutes. **You must not ask questions.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

(Page 1)

ANSWERS

If you can't do a sum in your head always work it out in the space near the sum, like this :

Tom had 18 nuts and he lost 5.
How many nuts has he now ?

$$\begin{array}{r} 18 \\ 5 \\ \hline 13 \end{array}$$

13

1. Jack had 4 nuts and he got 7 more. How many has he now ?

2. Tom is 8 years old. Peter is 15 years old. How much older is Peter than Tom ?

3. We have 20 hens. There are 8 white hens, 3 black hens, and the rest are brown. How many hens are brown ?

4. I spent 10d. and then 9d. How much did I spend altogether ?

5. One box holds 5 books. How many boxes will I want for 35 books ?

6. John had 29 stamps in his stamp book. He saved 34 more. How many has he now.

7. How many sweets will be left out of 42 if 17 sweets are eaten ?

8. Ten boys are given 2 pennies each. How many shillings and pence is this ?

(Page 2)

Answers

9. There were 35 buns on a plate. 8 boys ate 4 buns each. How many buns were left? ....

10. How many shillings would I pay for 12 cards at sixpence each? ....

11. I have 2 half-crowns, 3 shillings, 4 sixpences and 2 threepences. How much money have I altogether? ....

12. There are 36 girls in our class. They each have 6 books. How many books have they altogether? ....

13. Mother gave her 4 children 5s. to share among themselves. Each child was to get the same. How much did each get? ....

14. I spend 1s. 6½d. on a book, 5½d. on a pencil, and 2d. on a pen. How much have I left from 4s.? ....

15. I buy 21 buns at 7 for 1s. How much will that cost? ....

16. I have 156 marbles. How many dozen have I? ....

(Page 3)

ANSWERS

17. I am 5 feet 4 inches tall. My friend is 6 inches shorter than I. How tall is she ? ....

18. My brother works from 9 o'clock in the morning until 6 o'clock in the evening, with an hour off for lunch. How long does he work each day ? ....

19. Father was 37 years old in 1945. In what year was he born ? ....

20. Teacher tells us to be in the schoolyard 10 minutes before the bell rings. In the afternoon the bell rings at 5 minutes past 1. At what time should we be in the yard ? ....

21. At our school each pupil pays 2s. 1d. for dinners and 5d. for milk every week. 32 boys take dinner and milk every week. How much money is paid altogether, every week, for all the boys ? ....

22. Apples cost 8d. per lb. and pears cost 11d. per lb. I buy 3 lbs. of each. How much more do the pears cost than the apples ? ....

23. The milkman leaves 1 pint of milk in our house every day except Sunday, when he leaves a quart. Milk costs 9d. a quart. How much is our milk bill every week ? ....

(Page 4)

ANSWERS

24. What is the cost of a dozen paper hats at 3¾d. each ? ....

25. A draper sells 1½ yards of linen, 2¾ yards of silk, and ¾ yard of muslin. How many yards of material does he sell ? ....

26. Petrol is 2s. 1½d. per gallon. How much do I pay for petrol to travel 100 miles if my car goes 25 miles on one gallon ? ....

27. I have a piece of string 1 yard 1 foot long, but I want a piece 4 times as long as this, and 1 foot extra. How much more string shall I have to get ? ....

28. My suit cost 2½ guineas. How much is this in £ s. d. ? ....

29. If 25 children sell 137 flags each, how many flags are sold altogether ? ....

30. A cake weighed 3 lbs. 12 ozs. A second cake weighed 1 lb. more than the first. Mother bought both of them. How much cake did she get ? ....

(Page 5)

ANSWERS

31. A bag of shillings weighed 3 lbs. If 4 shillings weigh 1 oz., how many shillings were there in the bag ?

....

32. I work 8 hours a day on Monday, Wednesday and Friday ; 7 hours on Tuesday and Thursday, and 4 hours on Saturday. What is the average length of my working day ?

....

33. A school needs 15 cricket balls. What will they cost if 1 dozen can be bought for £2 ?

....

34. Share £1 between Bob and Bill so that Bob gets 2s. 6d. more than Bill.

....

35. If $\frac{3}{5}$ of the people in a bus load of 40 people are women, how many of the people are men ?

....

36. After spending $\frac{1}{3}$ of my money, I have 2s. 6d. left. How much did I have at first ?

....

37. How much will 3 cwt. of coal cost at £2, 10s. per ton ?

....

(Page 6)

ANSWERS

38. The distance all round a square is 12 inches. What is its area? ....

39. From A to B is 7·7 miles. From B to C is 4·4 miles more than from A to B. How far is it from A to C? ....

40. A pot of jam contains 1 lb. of jam and the sugar in it weighs 3 ozs. What percentage of sugar is there in the jam? ....

41. Jones and Smith painted a house together and were paid £16. But Jones had worked 3 times as long as Smith at the job. How should they share the £16? ....

42. A man can cycle at the rate of 10½ miles per hour. He leaves home at 2.30 p.m. and cycles till 4 p.m.; he then has his tea and starts again at 4.30 p.m., getting home at 6.0 p.m. How far does he cycle? ....

43. A man bought 6 rare stamps at 5s. each and sold them to make a profit of 4s. 6d. How much did he sell each stamp for? ....

44. A leaking tap wastes ½ pint of water in 2 minutes. How many gallons of water are wasted from 2 p.m. to 6 p.m.? ....

(Page 7)

ANSWERS

45. A boy buys 100 newspapers at 1s. 4d. for 20 and he sells them at 1d. each. How much profit does he make ?

……………

46. A train consists of 18 trucks, each 14 feet long. There is 3 feet space between each truck and between the engine and the first truck. Find the length of the whole train if the engine is 33 feet long.

……………

47. A room is twice as long as it is wide. If it is 20 feet 6 inches long, what will be the total length of the picture rail needed for the four walls ?

……………

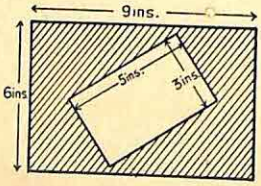
48. A sports dealer bought a bat for £1 and sold it for £2, 10s. What was his gain per cent. ?

……………

49. Jim has 2s. 5d., Jack has 2s. 3d., Tom has 1s. 10d. How much must Jim and Jack each give to Tom so that they share the money equally ?

……………

50. This is a sheet of metal. If the whole sheet was worth 4s. 6d., what was the value of the shaded piece ?



……………

ANSWERS

Problem Arithmetic Test, Form A

1. 11
2. 7
3. 9
4. 1s. 7d.
5. 7
6. 63
7. 25
8. 1s. 8d.
9. 3
10. 6s.
11. 10s. 6d.
12. 216
13. 1s. 3d.
14. 1s. 10d.
15. 3s.
16. 13
17. 4 ft. 10 ins.
18. 8 hours
19. 1908
20. 12·55
21. £4, 0s. 0d.
22. 9d.
23. 3s.
24. 3s. 9d.
25. 5 yds.
26. 8s. 6d.
27. 4 yds. 1ft.
28. £2, 12s. 6d.
29. 3425
30. 8 lbs. 8 ozs.
31. 192 shillings
32. 7 hours
33. £2, 10s.
34. 8s. 9d. and 11s. 3d.
35. 16 men
36. 3s. 9d.
37. 7s. 6d.
38. 9 sq. ins.
39. 19·8 miles
40. 18·75 per cent.
41. £12 and £4
42. 31½ miles
43. 5s. 9d.
44. 7 galls. 4 pints
45. 1s. 8d.
46. 339 ft. or 113 yds.
47. 20 yds. 1 ft. 6 ins.
48. 150 per cent.
49. Jim 3d., Jack 1d.
50. 3s. 3d.

ANSWERS

PROBLEM ARITHMETIC TEST, FORM B

1. 13
2. 9
3. 9
4. 1s. 7d.
5. 8
6. 63
7. 25
8. 1s. 10d.
9. 3d.
10. 7s. 0d.
11. 11s. 6d.
12. 222
13. 1s. 4d.
14. 2s. 8d.
15. 3s. 0d.
16. 14
17. 5 ft. 2 ins.
18. $7\frac{1}{2}$ hours
19. 1906
20. 12·55
21. £4, 11s. 3d.
22. 1s. 8d.
23. 3s. 0d.
24. $4\frac{3}{4}$d.
25. $7\frac{1}{4}$
26. 8s. 2d.
27. 7 yds. 1 ft.
28. £4, 14s. 6d.
29. 3550
30. 11 lbs. 8 ozs.
31. 36
32. 8
33. £3
34. 11s. and 14s.
35. 21
36. 4s. 8d.
37. £7, 10s. 0d.
38. 20 ft.
39. 31·6 or 4·8
40. 31·25 per cent.
41. 20s., 5s.
42. $19\frac{1}{4}$
43. 6d.
44. $22\frac{1}{2}$
45. 7s. 6d.
46. 930 ft., or 310 yds.
47. 125 per cent.
48. 84 ft.
49. 40
50. 2s. $1\frac{1}{2}$d.

FORM B

THE ESSENTIAL PROBLEM ARITHMETIC TEST

FOR PUPILS 7+ TO 14+

Name ....

Boy or Girl ....

Your Age ....

Date of Birthday ....

Class ....

School ....

....

FOR THE TEACHER	
Page 1	
Page 2	
Page 3	
Page 4	
Page 5	
Page 6	
Page 7	
TOTAL SCORE . .	
Actual age in years and completed months	
Arithmetic age .	

READ THIS CAREFULLY

1. Do the sums in this booklet as carefully and as quickly as you can.
2. Some of the sums are very easy. You can work them in your head and just write the answer on the dotted line at the right of the sum.
3. If you can't do a sum in your head, work it out in the space near the sum. Do all the working you want on this paper.
4. If you can't do a sum leave it and go on with the next. When you finish one page go on to the next page **without waiting.**
5. The first sums are easy, then they get harder, but no one is expected to do everything. Just do your best.
6. You have 30 minutes. **You must not ask questions.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

(Page 1)

ANSWERS

If you can't do a sum in your head always work it out in the space near the sum, like this :

Tom had 19 nuts and he lost 4.
How many nuts has he now ?

$$\begin{array}{r} 19 \\ 4 \\ \hline 15 \end{array}$$

15 ....

1. Tom has 5 marbles and he got 8 more. How many has he now ? ....

2. Jim has 13 nuts and Tom has 4 nuts. How many more nuts has Jim than Tom ? ....

3. We have 20 cows. There are 7 white cows and 4 black cows and the rest are brown. How many cows are brown ? ....

4. I spent 8d. and then spent 11d. How much did I spend altogether ? ....

5. One bag holds 4 apples. How many bags do I want for 32 apples ? ....

6. Mary had 28 stamps and John gave her 35 more. How many has she now ? ....

7. How many nuts will be left out of 41 if 16 nuts are eaten ? ....

8. I give 2 pennies to each of 11 boys. How many shillings and pence is this ? ....

(Page 2)

ANSWERS

9. I had 30 pennies and I gave 3 boys 9 pennies each. How many have I left ? ....

10. How many shillings will I have to pay for 14 books at sixpence each ? ....

11. I have 3 half crowns, 2 shillings, 3 sixpences and 2 threepences. How much money have I altogether ? ....

12. There are 37 boys in our class. They each have 6 books. How many books have they altogether ? ....

13. Father gave Tom, Dick and Jack 4s. to share among themselves. Each was to get the same. How much did each get ? ....

14. I spend 1s. 4½d. on a book, 7½d. on a pen and 4d. on a pencil. How much have I left from 4s. ? ....

15. I buy 24 buns at 8 for 1s. How much will that cost ? ....

16. I have 168 marbles. How many dozen have I ? ....

(Page 3)

ANSWERS

17. I am 5 feet 5 inches tall. My friend is 3 inches shorter than I am. How tall is she ?

....

18. My father works from 8 o'clock in the morning till 5 o'clock in the evening with an hour and a half off for lunch. How long does he work each day ?

....

19. Mother was 39 years old in 1945. In what year was she born ?

....

20. We must be in the school yard 15 minutes before the bell rings. In the afternoon the bell rings at 10 minutes past 1. At what time should we be in the yard ?

....

21. At school each pupil pays 2s. 7½d. for dinners and 5d. for milk every week. 30 boys take dinner and milk every week. How much money is paid altogether each week for all the boys ?

....

22. Plums cost 7d. per lb. and pears 1s. per lb. I buy 4 lbs. of each. How much more do the pears cost than the plums ?

....

23. The baker leaves 1 loaf of bread in our house every day except Saturday and Sunday. He leaves 3 loaves on Saturday and none on Sunday. Bread costs 4½d. per loaf. How much is our bread bill each week ?

....

(Page 4)

ANSWERS

24. Find the cost of one book if a dozen cost 4s. 9d. ....

25. A man sells $2\frac{1}{2}$ yards of linen, $\frac{1}{4}$ yard of lace, $\frac{3}{4}$ yard of silk and $3\frac{3}{4}$ yards of elastic. How many yards of material does he sell ? ....

26. Petrol is 2s. $0\frac{1}{2}$d. per gallon. How much does it cost to travel 120 miles if my car does 30 miles on one gallon of petrol ? ....

27. I have a piece of wire 1 yard 2 feet 6 inches long and I want another piece 4 times as long. How long will the second piece have to be ? ....

28. My bicycle cost $4\frac{1}{2}$ guineas. How much is this in £ s. d. ? ....

29. In 25 streets there are 142 houses in each street. How many houses are there in the town ? ....

30. A piece of meat weighed 4 lbs. 12 ozs. A second piece weighed 2 lbs. more than the first. Mother bought both pieces. How much meat did she get ? ....

(Page 5)

ANSWERS

31. A bag of pennies weighed $\frac{3}{4}$ lb. If 3 pennies weigh 1 oz., how many pennies were there in the bag ? ....

32. Some hens laid 8 eggs on Monday, Tuesday and Wednesday, 10 eggs on Thursday and Friday, 6 eggs on Saturday and Sunday. What is the average number of eggs laid each day ? ....

33. I can buy 1 dozen rose bushes for £2, 5s. How much will I have to pay for 16 bushes ? ....

34. How much will Jim and Tom each get if they share 25s. so that Tom gets 3s. more than Jim ? ....

35. In a box of 30 eggs $\frac{3}{10}$ are cracked. How many eggs are not cracked ? ....

36. A boy lost $\frac{1}{4}$ of his money and had 3s. 6d. left. How much did he have at first ? ....

37. How much will 3 tons of coal cost if 1 cwt. costs 2s. 6d. ? ....

(Page 6)

ANSWERS

38. A square flower bed is 25 square feet in area. How far is it all round the edges ? ....

39. The distance from town A to town C is 18·2 miles. From B to C it is 4·8 miles less than from A to C. How far is it from A to B ? ....

40. A box has in it 32 lbs. of apples, but 10 lbs. are bad. What percentage of apples in the box is bad ? ....

41. Ted and Joe together picked beans. Ted worked four times as long as Joe and the farmer gave them 25s. to share between them. How much should each boy get ? ....

42. A boy walks at the rate of 3½ miles an hour. He leaves home at 10 o'clock, stops at 12 o'clock for lunch and then goes on again at 1.30. How far has he walked by 5 o'clock ? ....

43. A boy bought a number of old coins for 10 shillings and later sold them for 15 shillings. This was 3d. profit on each coin. How much did he pay for each coin in the first place ? ....

44. In a factory a woman fills 2 bottles of vinegar each holding a pint every 2 minutes. How many gallons of vinegar does she bottle from 9 a.m. to midday ? ....

(Page 7)

ANSWERS

45. A shopkeeper buys 180 eggs at 2s. 6d. per dozen and sells them at 3d. each. How much profit does he make ?

46. A convoy of 25 tanks each 18 feet long is parked along a long straight road. There is a 20 feet space between each tank. What is the distance between the front of the first tank and the end of the last tank ?

47. A farmer bought a calf for £2 and sold it for £4, 10s. What was his gain per cent. ?

48. A schoolroom is 3 times as long as it is wide. It is 10 feet 6 inches wide. What will be the length of the picture rail round the four walls ?

49. Half of a number taken from three-quarters of the number is 10. What is the number ?

50. This is a piece of leather. If the whole piece was worth 8s. 6d., what was the value of the shaded piece ?

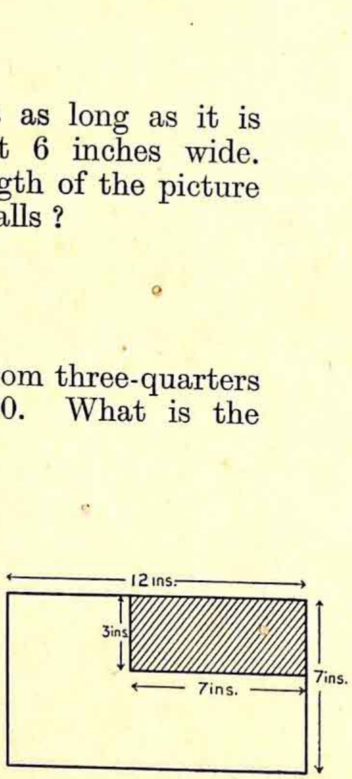


TABLE VIII

ESSENTIAL MECHANICAL TEST, FORMS A AND B

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
3	7	0	15	9	2	27	11	2	39	13	9
4	7	2	16	9	4	28	11	4	40	14	0
5	7	5	17	9	6	29	11	6	41	14	3
6	7	6	18	9	8	30	11	9	42	14	6
7	7	8	19	9	10	31	12	0			
8	7	10	20	10	0	32	12	3			
9	8	1	21	10	2	33	12	6			
10	8	4	22	10	4	34	12	9			
11	8	6	23	10	6	35	12	11			
12	8	8	24	10	8	36	13	2			
13	8	10	25	10	10	37	13	4			
14	9	0	26	11	0	38	13	6			

Score over 42 Arithmetic age over 14½ years.

TABLE IX

ESSENTIAL PROBLEM ARITHMETIC TEST, FORMS A AND B

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
3	7	0	14	9	8	25	11	9	36	14	10
4	7	4	15	9	11	26	12	0	37	15	2
5	7	6	16	10	1	27	12	3	38	15	6
6	7	9	17	10	2	28	12	6			
7	8	0	18	10	4	29	12	9			
8	8	3	19	10	6	30	13	0			
9	8	6	20	10	8	31	13	3			
10	8	9	21	10	11	32	13	6			
11	9	0	22	11	1	33	13	10			
12	9	3	23	11	4	34	14	2			
13	9	6	24	11	6	35	14	6			

A score of over 38 represents an arithmetic age of 15½+ years.

(2) DIAGNOSTIC ARITHMETIC TESTS

The twelve tests on pages 107-121 have been compiled primarily as diagnostic tests for detecting pupils' difficulties in arithmetic. The construction of the tests follows the development of a child's skill in arithmetic. The material is so arranged in progressive steps of increasing difficulty in the various operations and processes that its use reveals the exact level reached by each pupil and the nature of the difficulties he is experiencing. To obtain a comprehensive estimate of a pupil's arithmetical skill in the various aspects of number work we naturally require more than a single testing, hence the number of tests given should be adequate and they should be spread effectively over an adequate period of time so as not to unduly hurry or harass the testee.

Full details of the tests and interpretation of the results are given in *Diagnosis of Individual Difficulties in Arithmetic* (Oliver and Boyd).

Answers to the tests are given on pages 122-126.

Scores with equivalent arithmetic ages for each of the twelve sets are given on pages 126-131.

In addition to their diagnostic value these twelve tests may also be used as measures of achievement or attainment if the given times are observed. Their particular value used in this form is that they afford an exact estimate of the pupil's attainment in each of the four processes of addition, subtraction, multiplication and division. Should a general estimate of a pupil's arithmetical attainments (in terms of arithmetic age) be required this can be obtained from the averaged results of tests 6, 7, 8*a*, 9, 10 and 12. Scores for each test having been translated into the corresponding arithmetic age by reference to the table of norms.

Thus in the case of Harry B. (age $9\frac{7}{12}$) his scores and equivalent ages in the various processes were as follows, giving him an average arithmetic age of $9\frac{2}{12}$.

	Score	*Age*
Test 6. Graded Addition	28	9 years 1 month
Test 7. Graded Subtraction	20	9 ,, 2 months
Test 8*a*. Graded Multiplication . . .	16	9 ,, 1 month
Test 9. Graded Short Division . . .	11	8 ,, 6 months
Test 10. Graded Long Division (Simple Steps) .	7	9 ,, 0 month
Test 12. Mental Arithmetic	20	10 ,, 2 months
Average Arithmetic Age		9 years 2 months

Diagnostic Arithmetic Tests

NOTE TO THE TEACHER

These tests are intended primarily for diagnosis of difficulties in arithmetic. For the best results pupils should not be hurried and should not attempt too much at one time.

With young or backward testees two working periods for each of tests 6 to 10 are advisable. With tests 8B, 10, and 11 two working periods are better for all pupils up to 11+ years. ***Lines are drawn to indicate the working units.***

Speed plus accuracy levels can be obtained for normal pupils by using the times listed below. Age standards for each test in given times are to be found on pages 126-131.

Name.. *Boy*/*Girl* *Age* ***LAST*** *birthday*..........................

Standard or Class.................................... *Name of School*..

Date........................... ....

READ THIS: IT TELLS YOU WHAT TO DO

This book contains many easy little sums. You will have plenty of time to do them. There are 12 tests, but you will not do them all on the same day. **Read carefully the lines at the top of each Test.** Work quickly and carefully. Do not start a new test until you are told to do so.

TEST.	SPEED TIMES IN MINUTES.	SCORES.		REMARKS. (See Note to Teacher)
		IN GIVEN TIME.	IN UNLIMITED TIME.	
1	3			
2	3½			
3	3			
4	3½			
5	5			
6	6			
7	5½			
8A	7			
8B	7			
9	5			
10	9			
11	15			
12	10			

TEST 1—ADDITION

These are all ‘ ADD ’ sums.

Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A	1+1=	0+0=	2+2=	2+1=	1+3=
B	2+0=	3+1=	3+3=	5+5=	4+1=
C	1+6=	4+0=	4+4=	1+7=	6+1=
D	7+1=	1+8=	1+5=	5+0=	7+7=
E	2+5=	3+2=	1+4=	0+2=	6+6=
F	4+3=	8+8=	2+9=	2+8=	5+4=
G	9+2=	9+1=	9+9=	3+0=	0+7=
H	0+1=	6+0=	6+2=	2+4=	0+4=
I	8+2=	6+4=	1+9=	4+5=	0+8=
J	8+3=	5+1=	7+2=	0+3=	1+2=
K	0+5=	4+2=	3+6=	8+1=	0+9=
L	1+0=	5+3=	2+7=	3+5=	7+0=
M	2+3=	5+2=	3+4=	8+0=	2+6=
N	6+3=	4+8=	0+6=	7+3=	8+4=
O	9+0=	3+7=	6+5=	7+4=	4+6=
P	3+8=	5+6=	3+9=	7+6=	9+3=
Q	6+7=	4+7=	8+9=	5+7=	9+4=
R	7+5=	5+9=	4+9=	8+6=	7+8=
S	9+5=	8+7=	6+9=	9+8=	9+7=
T	6+8=	9+6=	8+5=	5+8=	7+9=

TEST 2—SUBTRACTION

These are all 'SUBTRACT' or 'TAKE AWAY' sums.
Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A	3−2=	1−1=	4−2=	5−4=	0−0=
B	5−3=	3−3=	5−1=	4−4=	8−1=
C	6−6=	4−3=	3−1=	2−1=	6−5=
D	5−2=	6−1=	9−1=	7−7=	9−8=
E	5−5=	7−1=	6−3=	2−2=	4−1=
F	6−2=	8−4=	9−9=	7−6=	6−4=
G	8−7=	9−0=	7−5=	6−0=	8−6=
H	9−5=	3−0=	8−2=	9−3=	7−2=
I	10−7=	10−1=	9−6=	5−0=	10−2=
J	12−6=	7−3=	4−0=	8−8=	1−0=
K	10−4=	2−0=	7−4=	9−7=	8−0=
L	9−2=	9−4=	10−5=	7−0=	8−5=
M	11−2=	10−6=	12−8=	14−7=	12−9=
N	8−3=	10−8=	11−5=	10−9=	11−8=
O	10−3=	12−4=	11−7=	16−8=	11−9=
P	12−7=	12−5=	13−6=	11−4=	18−9=
Q	11−3=	15−8=	15−7=	11−6=	12−3=
R	14−8=	15−9=	13−8=	15−6=	13−5=
S	14−6=	13−4=	17−8=	16−9=	13−7=
T	17−9=	14−5=	14−9=	13−9=	16−7=

TEST 3—MULTIPLICATION

These are all ‘ MULTIPLY ’ or ‘ TIMES ’ sums.
Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A	1×3=	2×2=	1×7=	2×1=	1×4=
B	5×1=	2×5=	1×6=	2×8=	1×5=
C	4×1=	2×3=	1×8=	3×2=	2×9=
D	5×4=	2×7=	4×4=	6×1=	5×2=
E	3×1=	1×9=	3×3=	3×5=	2×6=
F	1×2=	4×3=	6×2=	5×5=	6×4=
G	3×6=	6×6=	2×4=	4×5=	6×3=
H	6×5=	4×2=	3×4=	5×3=	3×9=
I	4×8=	5×6=	5×8=	5×7=	3×8=
J	5×9=	1×1=	6×8=	6×9=	6×7=
K	4×9=	3×7=	4×7=	4×6=	7×1=
L	7×2=	9×2=	8×2=	9×1=	0×5=
M	8×1=	8×3=	7×3=	4×0=	7×5=
N	9×9=	0×3=	9×5=	0×6=	0×4=
O	0×0=	0×9=	8×4=	9×0=	7×4=
P	8×8=	2×0=	8×9=	9×8=	7×0=
Q	8×6=	0×8=	7×6=	1×0=	5×0=
R	8×7=	7×9=	3×0=	9×6=	7×7=
S	8×0=	6×0=	7×8=	8×5=	0×2=
T	9×7=	9×3=	0×1=	0×7=	9×4=

TEST 4—DIVISION

These are all 'DIVIDE' sums.

Work across the page.

	(a)	(b)	(c)	(d)	(e)
A	$4 \div 2 =$	$10 \div 2 =$	$9 \div 3 =$	$6 \div 2 =$	$10 \div 5 =$
B	$15 \div 3 =$	$8 \div 2 =$	$14 \div 2 =$	$20 \div 5 =$	$25 \div 5 =$
C	$12 \div 2 =$	$16 \div 2 =$	$12 \div 6 =$	$12 \div 3 =$	$15 \div 5 =$
D	$6 \div 3 =$	$36 \div 6 =$	$40 \div 5 =$	$16 \div 4 =$	$12 \div 4 =$
E	$30 \div 5 =$	$21 \div 3 =$	$7 \div 1 =$	$4 \div 1 =$	$5 \div 1 =$
F	$35 \div 5 =$	$6 \div 1 =$	$3 \div 1 =$	$42 \div 6 =$	$18 \div 3 =$
G	$30 \div 6 =$	$20 \div 4 =$	$8 \div 1 =$	$8 \div 4 =$	$45 \div 5 =$
H	$9 \div 1 =$	$18 \div 2 =$	$24 \div 6 =$	$32 \div 4 =$	$2 \div 1 =$
I	$18 \div 6 =$	$24 \div 4 =$	$48 \div 6 =$	$24 \div 3 =$	$27 \div 3 =$
J	$5 \div 5 =$	$4 \div 4 =$	$54 \div 6 =$	$3 \div 3 =$	$2 \div 2 =$
K	$36 \div 4 =$	$6 \div 6 =$	$28 \div 4 =$	$1 \div 1 =$	
L	$14 \div 7 =$	$21 \div 7 =$	$27 \div 9 =$	$16 \div 8 =$	$32 \div 8 =$
M	$18 \div 9 =$	$56 \div 7 =$	$81 \div 9 =$	$35 \div 7 =$	$45 \div 9 =$
N	$0 \div 1 =$	$49 \div 7 =$	$28 \div 7 =$	$0 \div 6 =$	$24 \div 8 =$
O	$40 \div 8 =$	$0 \div 4 =$	$72 \div 9 =$	$0 \div 3 =$	$72 \div 8 =$
P	$0 \div 2 =$	$42 \div 7 =$	$0 \div 5 =$	$36 \div 9 =$	$0 \div 7 =$
Q	$48 \div 8 =$	$63 \div 7 =$	$0 \div 8 =$	$64 \div 8 =$	$63 \div 9 =$
R	$0 \div 9 =$	$54 \div 9 =$	$7 \div 7 =$	$56 \div 8 =$	$9 \div 9 =$
S	$8 \div 8 =$				

TEST 5—MISCELLANEOUS

There are FOUR kinds of sums here, 'ADD,' 'SUBTRACT,' 'MULTIPLY,' 'DIVIDE.'

Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A	3+ 8=	12− 5=	7× 6=	3+ 9=	42÷ 7=
B	27÷ 3=	5× 0=	12− 7=	11− 4=	15− 7=
C	9+ 3=	36÷ 9=	7× 9=	7+ 6=	8+ 9=
D	9+ 4=	12− 3=	1× 0=	4× 6=	13− 6=
E	0÷ 5=	48÷ 8=	64÷ 8=	9× 6=	8× 7=
F	14− 8=	4+ 7=	5+ 6=	5÷ 5=	3× 0=
G	6+ 7=	8× 0=	63÷ 9=	18− 9=	7× 7=
H	4+ 9=	0÷ 8=	63÷ 7=	6× 9=	11− 6=
I	15− 8=	0× 2=	9× 3=	8× 5=	4÷ 4=
J	54÷ 9=	5+ 7=	8+ 6=	9+ 5=	7+ 8=
K	11− 3=	13− 8=	6× 0=	14− 6=	7÷ 7=
L	36÷ 4=	15− 9=	13− 5=	6× 7=	7× 8=
M	0× 1=	6+ 9=	17− 8=	15− 6=	0÷ 7=
N	54÷ 6=	4× 9=	0× 5=	13− 4=	16− 9=
O	11× 7=	84÷12=	88÷11=	12× 6=	10×12=
P	12× 4=	11×11=	96÷12=	11×12=	121÷11=
Q	60÷12=	12× 7=	108÷12=	12× 8=	120÷12=
R	72÷12=	11×10=	11× 8=	132÷12=	12×11=
S	11× 9=	77÷11=	144÷12=	12×12=	110÷11=
T	48÷12=	12× 5=	99÷11=	132÷11=	12× 9=

TEST 6—GRADED ADDITION

These are all 'ADD' sums.

Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
A	14 +3	15 +4	12 +6	2 +17	10 +15	13 +16	12 +14	11 +10
B	31 +66	65 +22	23 +73	28 +30	123 +45	346 +212	482 +305	543 +126
C	9 +19	15 +6	6 +17	9 +17	57 +7	58 +6	6 +89	8 +68
D	87 +31	96 +63	84 +94	50 +81	23 +17	39 +48	14 +79	37 +59
E	401 +607	209 +39	874 +83	635 +944	56 +69	38 +86	57 +59	54 +97
F	74 56 +43	38 78 +94	46 37 +96	86 48 +39	897 +497	953 +818	765 +488	925 +469
G	77 48 32 +65	94 83 76 +59	277 183 +149	126 848 +976	28 103 784 +9	608 705 33 +219	3 81 19 827 +94	951 382 467 539 +196

H 6+4+9+7+8+5+3+9=

I 9+8+7+6+5+8+7+3+2+0+7=

TEST 7—GRADED SUBTRACTION

These are all 'SUBTRACT' or 'TAKE AWAY' sums.

Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
A	98 −3	57 −4	84 −1	38 −8	55 −32	99 −43	78 −10	97 −22
B	346 −215	987 −832	378 −122	496 −261	18 −14	19 −18	16 −10	17 −15
C	71 −2	62 −4	46 −7	84 −6	54 −39	22 −17	58 −19	46 −27
D	331 −18	543 −25	283 −29	786 −58	316 −27	564 −59	68 −59	387 −299
E	980 −930	168 −68	80 −57	430 −416	180 −71	250 −49	160 −31	890 −889
F	346 −284	629 −473	756 −382	387 −196	364 −295	831 −276	8354 −5676	8112 −6798
G	800 −695	607 −298	700 −192	906 −199	891 −207	904 −206	705 −109	6067 −5970

TEST 8A—GRADED MULTIPLICATION

These are all 'MULTIPLY' or 'TIMES' sums.

Work across the page and put your working on the page.

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)
A	22 ×4	31 ×5	63 ×2	91 ×5	423 ×3	612 ×4
B	711 ×5	843 ×2	60 ×6	303 ×3	400 ×8	9010 ×5
C	18 ×9	17 ×5	16 ×7	19 ×7	76 ×9	86 ×8
D	96 ×6	87 ×4	104 ×9	106 ×7	8050 ×11	7004 ×8
E	348 ×12	4196 ×11	95347 ×12	874615 ×9	34 ×22	52 ×31
F	78 ×94	64 ×57	80 ×97	60 ×84	79 ×30	56 ×90
G	90 ×90	8460 ×600	80 ×100	1000 ×70	483 ×59	540 ×75

TEST 8B—GRADED MULTIPLICATION

These are all 'MULTIPLY' or 'TIMES' sums.

Work across the page and put your working on the page.

	(a)	*(b)*	*(c)*
H	870 ×64	605 ×29	408 ×37
I	976 ×78	206 ×50	607 ×60
J	612 ×517	706 ×309	338 ×430
K	7651 ×301	7080 ×605	

TEST 9—GRADED DIVISION

These are all 'DIVIDE' sums. If there is a remainder write it down. Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)
A	$4\overline{)44}$	$2\overline{)84}$	$3\overline{)96}$	$6\overline{)666}$
B	$2\overline{)682}$	$4\overline{)844}$	$3\overline{)696}$	$2\overline{)2426}$
C	$3\overline{)906}$	$2\overline{)806}$	$4\overline{)840}$	$3\overline{)690}$
D	$4\overline{)800}$	$3\overline{)900}$	$6\overline{)600}$	$8\overline{)1600}$
E	$5\overline{)1515}$	$7\overline{)6342}$	$9\overline{)8136}$	$8\overline{)4856}$
F	$4\overline{)27}$	$8\overline{)53}$	$9\overline{)80}$	$7\overline{)61}$
G	$7\overline{)50}$	$4\overline{)97}$	$9\overline{)89}$	$6\overline{)57}$
H	$5\overline{)156}$	$4\overline{)167}$	$7\overline{)149}$	$6\overline{)128}$
I	$9\overline{)372}$	$12\overline{)759}$	$8\overline{)697}$	$11\overline{)569}$
J	$3\overline{)248}$	$6\overline{)745}$	$5\overline{)3462}$	$7\overline{)5573}$
K	$8\overline{)29643}$	$5\overline{)25357}$	$7\overline{)49010}$	$9\overline{)307868}$

TEST 10—LONG DIVISION

These are all 'DIVIDE' sums. Put your working on the page. Where there is a remainder write it. Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)
A	$20\overline{)40}$	$33\overline{)99}$	$43\overline{)86}$	$21\overline{)84}$
B	$23\overline{)48}$	$32\overline{)99}$	$24\overline{)49}$	$20\overline{)86}$
C	$43\overline{)89}$	$20\overline{)97}$	$22\overline{)56}$	$31\overline{)98}$
D	$33\overline{)74}$	$42\overline{)93}$	$23\overline{)72}$	$41\overline{)90}$
E	$21\overline{)126}$	$32\overline{)128}$	$41\overline{)164}$	$53\overline{)159}$
F	$43\overline{)139}$	$94\overline{)189}$	$71\overline{)288}$	$82\overline{)248}$
G	$36\overline{)756}$	$63\overline{)1449}$	$52\overline{)1456}$	$97\overline{)3298}$
H	$41\overline{)3199}$	$84\overline{)5379}$	$95\overline{)7698}$	$93\overline{)5866}$
I	$48\overline{)3360}$	$81\overline{)4050}$	$54\overline{)2700}$	$56\overline{)2800}$

TEST 11—LONG DIVISION

These are 'DIVIDE' sums. Show your working. Put in remainders. Work across the page.

	(*a*)	(*b*)	(*c*)	(*d*)
A	$36\overline{)723}$	$55\overline{)1769}$	$63\overline{)3909}$	$73\overline{)5116}$
B	$18\overline{)54}$	$39\overline{)156}$	$35\overline{)210}$	$26\overline{)104}$
C	$29\overline{)261}$	$15\overline{)115}$	$49\overline{)366}$	$68\overline{)615}$
D	$35\overline{)1645}$	$27\overline{)918}$	$46\overline{)3012}$	$24\overline{)984}$
E	$25\overline{)11475}$	$36\overline{)13657}$	$78\overline{)14742}$	$29\overline{)17632}$
F	$17\overline{)12036}$	$79\overline{)3090}$	$21\overline{)17659}$	$58\overline{)46814}$

TEST 12—GRADED MENTAL ARITHMETIC

Work these sums in your head. Write down the answers at the sides.

+ 1. In a shop there are three tops and nine balls. How many toys are there altogether? . . . .

+ 2. In a street I saw three cats, four dogs and five horses. How many animals did I see altogether? . . . .

− 3. There were nineteen sparrows on the footpath. Nine flew away. How many were left? . . . .

− 4. Tom had twenty marbles, but lost six. How many has he now? ....

× 5. I get four marbles for a penny. How many can I get for threepence? . . . .

÷ 6. I have twenty-four apples to divide amongst four boys. How many should each get if they are all to have the same number? ....

× 7. A baker left three loaves at each of 6 houses. How many loaves did he leave altogether? . . . .

− 8. I had 6d. and spent 3½d. on sweets. How much had I left? . ...

÷ 9. What should I have to pay for 20 penny oranges? . . . .

÷ 10. How many ½d. stamps could I buy for 8d.? . . . .

− 11. If I had 9 more eggs, I should have 30. How many have I now? . . . .

× 12. I went for a bathe every day for 5 weeks. How many bathes did I have? . . . .

− 13. What is the difference between 23 and 32? . . . .

÷ 14. I have 84 apples and want to share them equally amongst 7 boys. How many should each get? . . . .

− + 15. A baker had 80 loaves. He sold 45 and then got 12 more from another cart. How many did he have then? . . . .

× 16. There are 9 trees in a row. How many are there in 8 rows? . ...

× 17. Eggs are 2d. each. What should I pay for one dozen? . . ..

× + 18. Mother gave me 6½d. Father gave me twice as much. How much have I now? . . . .

÷ × 19. A pound of jam needs 8 ounces of sugar. How many pounds of sugar will 4 pounds of jam need? . . . .

+ 20. I spent 2s. 1d. out shopping and still have 1s. 5d. How much had I at the start? . . . .

+ − 21. I spent 1s. 6d. on a tie, 4s. on socks, and a shilling on a collar. How much change did I get out of 10s.? . . . .

22. Add together a half-crown, a florin, a shilling, a sixpence and three halfpence . . . .

23. At a concert 33 people paid for seats at one shilling each. How much was paid in pounds and shillings ? . . . .

24. What will 5 pounds of apples at 5d. per pound and 3 pounds of pears at 4d. per pound cost altogether ? . . . .

25. Bananas are 5 for 6d. How many will I get for 1s. 6d. ? . ...

26. What is left out of 1s. 6d. after buying 7 penny and 5 three-halfpenny stamps ? . . . .

27. A piece of wire is 3 feet 6 inches long. How many pieces 1 inch long can I cut from it ? . . . .

28. Seven fish cost 10½d. How much did each fish cost ? . . ..

29. Butter costs 1s. 2d. per pound. How much will I have to pay for a quarter of a pound ? . . . .

30. How many miles shall I walk in 2½ hours at 6 miles per hour ? . ...

31. In a box of 100 eggs, 2 out of every 10 were bad. How many good eggs were there in the box ? . . . .

32. A lesson starts at 10.15 A.M. and lasts 40 minutes. At what time does it finish ? . . . .

33. The railway fare to my uncle's home is 2s. 6d. return. If I visit him 9 times a year, how much do I spend in fares ? . ...

34. A piece of linen is 10 inches square. I am going to put lace round all sides ; how much lace will I need if I allow 2 inches extra for each corner ? . . . .

35. Jack has to travel 100 yards along a straight road to school. He goes half way and then goes 25 yards along a side street and back to fetch a friend. How far does he walk to school ? ....

36. A box is 6 inches long, 6 inches wide and 6 inches deep. How much string will I need to tie it up if the string goes round the box twice (once each way) and uses 3 inches for the knot ? ....

37. If 2 pounds of sugar cost 5d., how much will 9 pounds cost ? . ...

38. How many pints of milk will be needed to fill a pail which holds 4¼ gallons ? . . . .

39. Tom starts his homework at 5.30 P.M. At five past six he has done half of it. At what time will he finish ? . . . .

40. What is the difference between half of 4s. 8d. and a quarter of it ? . . . .

ANSWERS TO THE DIAGNOSTIC ARITHMETIC TESTS

Answers to the 13 tests are set out below. When pupils are correcting their own results teachers should read the answers across the pages in the order in which they have been worked.

TEST 1. ADDITION

100 Basic Addition Combinations

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A.	2	0	4	3	4
B.	2	4	6	10	5
C.	7	4	8	8	7
D.	8	9	6	5	14
E.	7	5	5	2	12
F.	7	16	11	10	9
G.	11	10	18	3	7
H.	1	6	8	6	4
I.	10	10	10	9	8
J.	11	6	9	3	3
K.	5	6	9	9	9
L.	1	8	9	8	7
M.	5	7	7	8	8
N.	9	12	6	10	12
O.	9	10	11	11	10
P.	11	11	12	13	12
Q.	13	11	17	12	13
R.	12	14	13	14	15
S.	14	15	15	17	16
T.	14	15	13	13	16

TEST 2. SUBTRACTION

100 Basic Subtraction Combinations

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A.	1	0	2	1	0
B.	2	0	4	0	7
C.	0	1	2	1	1
D.	3	5	8	0	1
E.	0	6	3	0	3
F.	4	4	0	1	2
G.	1	9	2	6	2
H.	4	3	6	6	5
I.	3	9	3	5	8
J.	6	4	4	0	1
K.	6	2	3	2	8
L.	7	5	5	7	3
M.	9	4	4	7	3
N.	5	2	6	1	3
O.	7	8	4	8	2
P.	5	7	7	7	9
Q.	8	7	8	5	9
R.	6	6	5	9	8
S.	8	9	9	7	6
T.	8	9	5	4	9

TEST 3. MULTIPLICATION

100 Basic Multiplication Combinations

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A.	3	4	7	2	4
B.	5	10	6	16	5
C.	4	6	8	6	18
D.	20	14	16	6	10
E.	3	9	9	15	12
F.	2	12	12	25	24
G.	18	36	8	20	18
H.	30	8	12	15	27
I.	32	30	40	35	24
J.	45	1	48	54	42
K.	36	21	28	24	7
L.	14	18	16	9	0
M.	8	24	21	0	35
N.	81	0	45	0	0
O.	0	0	32	0	28
P.	64	0	72	72	0
Q.	48	0	42	0	0
R.	56	63	0	54	49
S.	0	0	56	40	0
T.	63	27	0	0	36

TEST 4. DIVISION

90 Basic Division Combinations

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A.	2	5	3	3	2
B.	5	4	7	4	5
C.	6	8	2	4	3
D.	2	6	8	4	3
E.	6	7	7	4	5
F.	7	6	3	7	6
G.	5	5	8	2	9
H.	9	9	4	8	2
I.	3	6	8	8	9
J.	1	1	9	1	1
K.	9	1	7	1	
L.	2	3	3	2	4
M.	2	8	9	5	5
N.	0	7	4	0	3
O.	5	0	8	0	9
P.	0	6	0	4	0
Q.	6	9	0	8	7
R.	0	6	1	7	1
S.	1				

TEST 5. MISCELLANEOUS

100 of the Most Difficult Combinations in Addition, Subtraction, Multiplication and Division

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)
A.	11	7	42	12	6
B.	9	0	5	7	8
C.	12	4	63	13	17
D.	13	9	0	24	7
E.	0	6	8	54	56
F.	6	11	11	1	0
G.	13	0	7	9	49
H.	13	0	9	54	5
I.	7	0	27	40	1
J.	6	12	14	14	15
K.	8	5	0	8	1
L.	9	6	8	42	56
M.	0	15	9	9	0
N.	9	36	0	9	7
O.	77	7	8	72	120
P.	48	121	8	132	11
Q.	5	84	9	96	10
R.	6	110	88	11	132
S.	99	7	12	144	10
T.	4	60	9	12	108

TEST 6. GRADED ADDITION

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
A.	17	19	18	19	25	29	26	21
B.	97	87	96	58	168	558	787	669
C.	28	21	23	26	64	64	95	76
D.	118	159	178	131	40	87	93	96
E.	1008	248	957	1579	125	124	116	151
F.	173	210	179	173	1394	1771	1253	1394
G.	222	312	609	1950	924	1565	1024	2535
H.	51							
I.	62							

TEST 7. GRADED SUBTRACTION

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
A.	95	53	83	30	23	56	68	75
B.	131	155	256	235	4	1	6	2
C.	69	58	39	78	15	5	39	19
D.	313	518	254	728	289	505	9	88
E.	50	100	23	14	109	201	129	1
F.	62	156	374	191	69	555	2678	1314
G.	105	309	508	707	684	698	596	97

TEST 8A. GRADED MULTIPLICATION

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)
A.	88	155	126	455	1,269	2,448
B.	3,555	1,686	360	909	3,200	45,050
C.	162	85	112	133	684	688
D.	576	348	936	742	88,550	56,032
E.	4,176	46,156	1,144,164	7,871,535	748	1,612
F.	7,332	3,648	7,760	5,040	2,370	5,040
G.	8,100	5,076,000	8,000	70,000	28,497	40,500

TEST 8B. GRADED MULTIPLICATION

H.	55,680	17,545	15,096
I.	76,128	10,300	36,420
J.	316,404	218,154	145,340
K.	2,302,951	4,283,400	

TEST 9. GRADED SIMPLE DIVISION

	(*a*)	(*b*)	(*c*)	(*d*)
A.	11	42	32	111
B.	341	211	232	1,213
C.	302	403	210	230
D.	200	300	100	200
E.	303	906	904	607
F.	6 r. 3	6 r. 5	8 r. 8	8 r. 5
G.	7 r. 1	24 r. 1	9 r. 8	9 r. 3
H.	31 r. 1	41 r. 3	21 r. 2	21 r. 2
I.	41 r. 3	63 r. 3	87 r. 1	51 r. 8
J.	82 r. 2	124 r. 1	692 r. 2	796 r. 1
K.	3,705 r. 3	5,071 r. 2	7,001 r. 3	34,207 r. 5

TEST 10. LONG DIVISION (EASY STEPS)

	(*a*)	(*b*)	(*c*)	(*d*)
A.	2	3	2	4
B	2 r. 2	3 r. 3	2 r. 1	4 r. 6
C.	2 r. 3	4 r. 17	2 r. 12	3 r. 5
D.	2 r. 8	2 r. 9	3 r. 3	2 r. 8
E.	6	4	4	3
F.	3 r. 10	2 r. 1	4 r. 4	3 r. 2
G.	21	23	28	34
H.	78 r. 1	64 r. 3	81 r. 3	63 r. 7
I.	70	50	50	50

TEST 11. LONG DIVISION (HARDER STEPS)

	(a)	(b)	(c)	(d)
A.	20 r. 3	32 r. 9	62 r. 3	70 r. 6
B.	3	4	6	4
C.	9	7 r. 10	7 r. 23	9 r. 3
D.	47	34	65 r. 22	41
E.	459	379 r. 13	189	608
F.	708	39 r. 9	840 r. 19	807 r. 8

TEST 12. GRADED MENTAL ARITHMETIC

1. 12
2. 12
3. 10
4. 14
5. 12
6. 6
7. 18
8. 2½d.
9. 1/8
10. 16
11. 21
12. 35
13. 9
14. 12
15. 47
16. 72
17. 2/-
18. 1/7½
19. 2 lbs.
20. 3/6
21. 3/6
22. 6/1½
23. £1 : 13 : 0
24. 3/1
25. 15
26. 3½d.
27. 42
28. 1½d.
29. 3½d.
30. 15
31. 80
32. 10.55 A.M.
33. £1 : 2 : 6
34. 48 inches
35. 150 yards
36. 51 inches
37. 1/10½
38. 34
39. 6.40 P.M.
40. 1/2

NORMS FOR DIAGNOSTIC ARITHMETIC TESTS

Table X

TEST 1. ADDITION COMBINATIONS

Time—3 minutes

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
25	7	0	45	8	8	64	10	0	83	11	8
27	7	1	46	8	9	65	10	1	84	11	10
28	7	2	47	8	9	66	10	2	85	12	0
29	7	3	48	8	10	67	10	3	86	12	4
30	7	4	49	8	11	68	10	4	87	12	6
31	7	5	50	9	0	69	10	5	88	12	8
32	7	6	51	9	1	70	10	6	89	12	10
33	7	7	52	9	2	71	10	7	90	13	0
34	7	8	53	9	3	72	10	8	91	13	2
35	7	9	54	9	3	73	10	10	92	13	4
36	7	10	55	9	4	74	10	11	93	13	6
37	7	11	56	9	5	75	11	0	94	13	10
38	8	1	57	9	6	76	11	1	95	14	2
39	8	2	58	9	7	77	11	2	96	14	6
40	8	3	59	9	8	78	11	4	97	14	9
41	8	4	60	9	9	79	11	5	98	15	0+
42	8	5	61	9	10	80	11	6	...	...	
43	8	6	62	9	11	81	11	7	...	...	
44	8	7	63	10	0	82	11	8	...	...	

TABLE XI

TEST 2. SUBTRACTION COMBINATIONS

Time—3½ minutes

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
23	7	0	43	8	8	62	9	11	81	11	8
25	7	1	44	8	8	63	10	0	82	11	10
26	7	2	45	8	9	64	10	0	83	12	0
27	7	3	46	8	10	65	10	1	84	12	2
28	7	4	47	8	11	66	10	2	85	12	4
29	7	5	48	8	11	67	10	3	86	12	6
30	7	6	49	9	0	68	10	4	87	12	9
31	7	7	50	9	1	69	10	5	88	13	0
32	7	8	51	9	2	70	10	6	89	13	3
33	7	9	52	9	2	71	10	7	90	13	6
34	7	10	53	9	3	72	10	8	91	13	9
35	8	0	54	9	4	73	10	10	92	14	0
36	8	1	55	9	5	74	10	11	93	14	3
37	8	2	56	9	5	75	11	0	94	14	6
38	8	3	57	9	6	76	11	1	95	14	9
39	8	4	58	9	7	77	11	2	96	15	0+
40	8	5	59	9	8	78	11	4	...	...	
41	8	6	60	9	9	79	11	5	...	...	
42	8	7	61	9	10	80	11	6	...	...	

TABLE XII

TEST 3. MULTIPLICATION COMBINATIONS

Time—3 minutes

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
16	7	0	35	8	10	54	10	3	73	11	11
17	7	1	36	8	11	55	10	3	74	12	0
18	7	2	37	9	0	56	10	4	75	12	2
19	7	4	38	9	0	57	10	5	76	12	3
20	7	5	39	9	1	58	10	6	77	12	5
21	7	6	40	9	2	59	10	7	78	12	6
22	7	7	41	9	3	60	10	8	79	12	8
23	7	8	42	9	4	61	10	9	80	12	10
24	7	10	43	9	5	62	10	10	81	13	0
25	7	11	44	9	6	63	10	11	82	13	2
26	8	0	45	9	7	64	11	0	83	13	4
27	8	1	46	9	8	65	11	1	84	13	6
28	8	2	47	9	9	66	11	2	85	13	10
29	8	4	48	9	9	67	11	3	86	14	2
30	8	5	49	9	10	68	11	4	87	14	6
31	8	6	50	9	11	69	11	5	88	14	9
32	8	7	51	10	0	70	11	6	89	15	0+
33	8	8	52	10	1	71	11	8	...	...	
34	8	9	53	10	2	72	11	9	...	...	

Table XIII

TEST 4. DIVISION COMBINATIONS

Time—3 minutes

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
8	7	0	28	9	0	48	10	5	68	11	11
9	7	1	29	9	1	49	10	5	69	12	0
10	7	2	30	9	2	50	10	6	70	12	1
11	7	4	31	9	3	51	10	7	71	12	2
12	7	5	32	9	4	52	10	8	72	12	4
13	7	6	33	9	5	53	10	9	73	12	5
14	7	8	34	9	6	54	10	9	74	12	6
15	7	9	35	9	7	55	10	10	75	12	8
16	7	11	36	9	8	56	10	11	76	12	10
17	8	0	37	9	8	57	11	0	77	13	0
18	8	2	38	9	9	58	11	1	78	13	2
19	8	3	39	9	10	59	11	2	79	13	4
20	8	5	40	9	11	60	11	3	80	13	6
21	8	6	41	9	11	61	11	3	81	13	9
22	8	7	42	10	0	62	11	4	82	14	0
23	8	8	43	10	1	63	11	5	83	14	3
24	8	9	44	10	2	64	11	6	84	14	6
25	8	10	45	10	2	65	11	7	85	14	9
26	8	11	46	10	3	66	11	8	86	15	0+
27	9	0	47	10	4	67	11	10	...		...

Table XIV

TEST 5. MISCELLANEOUS COMBINATIONS

Time—3 minutes

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
4	7	0	25	9	2	45	10	9	65	12	3
6	7	2	26	9	3	46	10	9	66	12	4
7	7	4	27	9	3	47	10	10	67	12	5
8	7	6	28	9	4	48	10	11	68	12	6
9	7	8	29	9	5	49	11	0	69	12	8
10	7	9	30	9	6	50	11	1	70	12	9
11	7	11	31	9	7	51	11	2	71	12	11
12	8	0	32	9	8	52	11	3	72	13	0
13	8	2	33	9	9	53	11	3	73	13	2
14	8	3	34	9	10	54	11	4	74	13	3
15	8	5	35	9	11	55	11	5	75	13	5
16	8	6	36	10	0	56	11	6	76	13	6
17	8	7	37	10	1	57	11	7	77	13	8
18	8	8	38	10	2	58	11	8	78	13	11
19	8	9	39	10	3	59	11	9	79	14	1
20	8	9	40	10	4	60	11	10	80	14	4
21	8	10	41	10	5	61	11	11	81	14	6
22	8	11	42	10	6	62	12	0	82	14	9
23	9	0	43	10	7	63	12	1	83	15	0+
24	9	2	44	10	8	64	12	2	...		...

Table XV

TEST 6. GRADED ADDITION

Time—6 *minutes*

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
11	7	0	23	8	6	35	9	10	47	11	9
12	7	2	24	8	7	36	9	11	48	12	0
13	7	3	25	8	9	37	10	1	49	12	3
14	7	4	26	8	10	38	10	2	50	12	6
15	7	6	27	8	11	39	10	3	51	13	0
16	7	8	28	9	1	40	10	5	52	13	6
17	7	9	29	9	2	41	10	6	53	14	0
18	7	10	30	9	3	42	10	9	54	14	6
19	7	11	31	9	5	43	10	11	55	15	0
20	8	2	32	9	6	44	11	1	...	...	
21	8	3	33	9	7	45	11	4	...	...	
22	8	5	34	9	9	46	11	6	...	...	

Table XVI

TEST 7. GRADED SUBTRACTION

Time—6 *minutes*

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
5	7	0	18	8	11	31	10	6	44	13	0
6	7	2	19	9	1	32	10	8	45	13	3
7	7	4	20	9	2	33	10	9	46	13	6
8	7	6	21	9	4	34	10	11	47	13	8
9	7	8	22	9	6	35	11	1	48	13	10
10	7	9	23	9	7	36	11	2	49	14	0
11	7	11	24	9	8	37	11	4	50	14	2
12	8	1	25	9	9	38	11	6	51	14	4
13	8	2	26	9	11	39	11	9	52	14	6
14	8	4	27	10	1	40	12	0	53	14	8
15	8	6	28	10	2	41	12	3	54	14	10
16	8	8	29	10	3	42	12	6	55	15	0
17	8	9	30	10	5	43	12	9	...	...	

TABLE XVII

TEST 8A. GRADED MULTIPLICATION

Time—7 minutes

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
5	7	6	15	8	11	25	10	8	35	12	9
6	7	3	16	9	1	26	10	11	36	13	0
7	7	6	17	9	2	27	11	1	37	13	3
8	7	8	18	9	4	28	11	4	38	13	6
9	7	11	19	9	6	29	11	6	39	14	0
10	8	1	20	9	8	30	11	8	40	14	6
11	8	4	21	9	11	31	11	11	41	15	0
12	8	6	22	10	1	32	12	1	...	...	
13	8	8	23	10	4	33	12	4	...	...	
14	8	9	24	10	6	34	12	6	...	...	

TABLE XVIII

TEST 8B. GRADED MULTIPLICATION

Time—7 minutes

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.
1	9	0	7	11	6
2	9	6	8	12	0
3	9	10	9	12	6
4	10	2	10	13	6
5	10	6		14	6
6	11	0	...	...	

TABLE XIX

TEST 9. GRADED DIVISION

Time—5 minutes

SCORES AND EQUIVALENT ARITHMETIC AGES

SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE		SCORE	ARITH. AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
2	7	0	13	8	10	24	10	6	35	12	6
3	7	2	14	9	0	25	10	8	36	12	10
4	7	4	15	9	2	26	10	10	37	13	2
5	7	6	16	9	4	27	11	0	38	13	6
6	7	8	17	9	6	28	11	2	39	13	10
7	7	10	18	9	8	29	11	4	40	14	2
8	8	0	19	9	9	30	11	6	41	14	6
9	8	2	20	9	11	31	11	8	42	15	0
10	8	4	21	10	1	32	11	11	...	...	
11	8	6	22	10	3	33	12	1	...	...	
12	8	8	23	10	4	34	12	4	...	...	

Table XX

TEST 10. GRADED LONG DIVISION (EASY STEPS)

Time—9 *minutes*

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
7	9	0	14	10	0	21	11	1	28	12	10
8	9	2	15	10	2	22	11	4	29	13	2
9	9	4	16	10	3	23	11	6	30	13	6
10	9	6	17	10	5	24	11	9	31	13	10
11	9	8	18	10	7	24	12	0	32	14	2
12	9	9	19	10	9	26	12	3	33	14	6
13	9	11	20	10	11	27	12	6	34	14	10

Table XXI

TEST 11. GRADED LONG DIVISION (HARDER STEPS)

Time—15 *minutes*

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
1	9	0	6	10	4	11	11	6	16	13	0
2	9	6	7	10	6	12	11	10	17	13	6
3	9	8	8	10	9	13	12	2	18	14	0
4	9	11	9	11	0	14	12	6	19	14	6
5	10	1	10	11	3	15	12	10	20	15	0

Table XXII

TEST 12. GRADED MENTAL ARITHMETIC

Time—10 *minutes*

Scores and Equivalent Arithmetic Ages

Score	Arith. Age		Score	Arith. Age		Score	Arith. Age		Score	Arith. Age	
	Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.		Yrs.	Mths.
3	7	0	12	8	7	21	10	5	30	12	6
4	7	2	13	8	10	22	10	7	31	12	9
5	7	4	14	9	0	23	10	10	32	13	0
6	7	6	15	9	2	24	11	0	33	13	6
7	7	8	16	9	5	25	11	3	34	14	0
8	7	10	17	9	7	26	11	6	35	...	
9	8	0	18	9	10	27	11	9	36	...	
10	8	2	19	10	0	28	12	0	...	...	
11	8	5	20	10	2	29	12	3	...	...	

VII. TESTS OF WRITTEN ENGLISH

PAGE
(1) *Diagnostic Tests* 133
English Usage 134
Capital Letters and Punctuation 137
Vocabulary 139
Sentence Structure 141
Answers and Instructions 144
Scores and Equivalent English Ages 147
(2) *Median Samples of Written Compositions* 149

THE four tests set out on pp. 133-142 relate to those aspects of written English which admit of objective measurement, namely, punctuation, grammatical usage, vocabulary, and variety and correctness of sentence structure. The first two tests cover the more mechanical elements of written English, namely the use of capital letters, punctuation and common grammatical usage, while tests 3 and 4 deal with the expressional aspects of English, that is, the extent of the pupil's vocabulary and his ability to frame correctly a variety of sentences. The tests may be used either for diagnostic purposes or as attainment measures. If used for diagnosing weakness in written English then no time limits should be set for the tests and it is advisable not to give more than two tests at a time. If the tests are used as attainment or achievement tests then the given times for each test should be strictly observed.

The tests are most suitable for an age range 9+ to 16 and should *not* be used with children experiencing any difficulty in reading. In all cases the instructions preceding each test should be read slowly to the testees, and the example should be worked aloud with them. Timing commences at the point at which the first example is started. The tests should be done in an atmosphere of friendliness and encouragement.

Diagnostic English Tests

Name.. *Boy* / *Girl* *Age* **last** *birthday*..

Standard or Class................................... *Name of School*...

Date...

READ THIS: IT TELLS YOU WHAT TO DO

This book contains a number of easy English Tests. The teacher will read the lines at the top of each test with you. Follow them carefully. You might not finish some tests, but do your best by working quickly and carefully. **Do not start a new test until you are told to do so.** Remember to turn over or go on to the next page where it says so.

TEST	TIMES IN MINUTES	SCORES		REMARKS
		IN GIVEN TIME	IN UNLIMITED TIME	
1	10			
2	10			
3	8			
4	15			
5	15			
TOTAL				

TEST I—ENGLISH USAGE

TIME—10 MINUTES

In each of these sentences ONE word has been left out. Read the whole sentence through and fill in the missing word on the dotted line. Sometimes the first letter of the word is given to help you.

Here are two sentences done for you.

1. The men s.............. the accident.
Correct: The men saw the accident.

2. That picture is pretty, but this one is p..............
Correct: That picture is pretty, but this one is prettier.

1. Did you see Mary ? No, I have not s.................her to-day.
2. These are beautiful roses, and this one is the ....beautiful of all.
3. All the boys are tall, but Sam is the ta.................
4. Several of the men w................. hurt.
5. Please mother, ... I have a pear ?
6. Mother washes baby, but Jack washes h.................
7. John has come and his sister c................. with him.
8. He hasn't any money and we .... any either.
9. I shall take a banana, a pear and .... apple.
10. She was here, but you .... absent.
11. The girl is l................. face downwards on the grass.
12. He is the man w................. gave me the envelope.
13. Dick and Tom w................. here a few minutes ago.
14. Mary's writing is bad, but Joan's is w................. than Mary's.
15. The teacher r................. the bell five minutes early yesterday.
16. I chased the dog and c................. it at the gate.
17. The boy who fell into the water was not dr................., for he could swim.
18. My brother and .... are the only children in our family.
19. Tom dr................. the picture of a ship with his crayon.
20. I have w................. a letter to my friend.
21. Have you done your sums ? Yes, we d................. them yesterday.
22. Has Mary had her milk ? Yes, she has d................. it all.
23. One of the boys .... here already ; the others will be here soon.
24. Have you started your work ? Yes, we have be................. it.
25. Both our cases are heavy, but yours is the h.................

[NOW TURN OVER

GO STRAIGHT ON WITH THESE

Read this to yourself: In each of these sentences draw a line under the word that makes the sentence CORRECT, like this:—

1. The farmer has $\genfrac{}{}{0pt}{}{\text{drove}}{\underline{\text{driven}}}$ the cattle home.

2. Mary and I $\genfrac{}{}{0pt}{}{\underline{\text{were}}}{\text{was}}$ there yesterday.

NOW DO THESE

26. Where have the boys put $\genfrac{}{}{0pt}{}{\text{their}}{\text{there}}$ football?

27. The sun $\genfrac{}{}{0pt}{}{\text{raises}}{\text{rises}}$ in the east and sets in the west.

28. The boys have $\genfrac{}{}{0pt}{}{\text{went}}{\text{gone}}$ home.

29. Ann has $\genfrac{}{}{0pt}{}{\text{broken}}{\text{broke}}$ the milk jug.

30. What news $\genfrac{}{}{0pt}{}{\text{are}}{\text{is}}$ there in the paper to-day?

31. If he $\genfrac{}{}{0pt}{}{\text{doesn't}}{\text{don't}}$ come soon I must go without him.

32. I haven't $\genfrac{}{}{0pt}{}{\text{anything}}{\text{nothing}}$ left in my basket.

33. Sally has $\genfrac{}{}{0pt}{}{\text{torn}}{\text{tore}}$ her dress.

34. Miss Brown is going to $\genfrac{}{}{0pt}{}{\text{learn}}{\text{teach}}$ us a new dance to-day.

35. He $\genfrac{}{}{0pt}{}{\text{used}}{\text{use}}$ to be in the navy.

36. Please pick up the books $\genfrac{}{}{0pt}{}{\text{that}}{\text{what}}$ fell on the floor.

37. I have never $\genfrac{}{}{0pt}{}{\text{known}}{\text{knew}}$ anyone so stubborn.

38. Did you know that there $\genfrac{}{}{0pt}{}{\text{was}}{\text{were}}$ two holes in your glove?

[GO ON TO THE NEXT PAGE

39. Nobody will have $\genfrac{}{}{0pt}{}{\text{anything}}{\text{nothing}}$ to do after six o'clock.

40. The boy $\genfrac{}{}{0pt}{}{\text{swam}}{\text{swum}}$ the length of the baths in one minute.

41. I drove the car as $\genfrac{}{}{0pt}{}{\text{slow}}{\text{slowly}}$ as possible.

42. I $\genfrac{}{}{0pt}{}{\text{can't}}{\text{can}}$ hardly read the writing on this paper.

43. Gladys sews better than $\genfrac{}{}{0pt}{}{\text{I.}}{\text{me.}}$

44. The stones at Stonehenge have $\genfrac{}{}{0pt}{}{\text{laid}}{\text{lain}}$ there for centuries.

45. Either Jess or Dora $\genfrac{}{}{0pt}{}{\text{has}}{\text{have}}$ your book.

46. I think $\genfrac{}{}{0pt}{}{\text{those}}{\text{that}}$ kind of fish can be caught in these waters.

47. Neither Ted nor Will $\genfrac{}{}{0pt}{}{\text{look}}{\text{looks}}$ well to-day.

48. Every one of the men did $\genfrac{}{}{0pt}{}{\text{their}}{\text{his}}$ duty.

49. The aeroplane, with all its passengers, $\genfrac{}{}{0pt}{}{\text{was}}{\text{were}}$ lost.

50. Sarah has asked you and $\genfrac{}{}{0pt}{}{\text{I}}{\text{me}}$ to the party.

51. Which of you two $\genfrac{}{}{0pt}{}{\text{are}}{\text{is}}$ to blame ?

52. It was $\genfrac{}{}{0pt}{}{\text{we}}{\text{us}}$ who broke the window.

53. The fleet $\genfrac{}{}{0pt}{}{\text{was}}{\text{were}}$ ordered to leave port.

54. Each of us will bring $\genfrac{}{}{0pt}{}{\text{our}}{\text{his}}$ own football boots.

TEST 2—CAPITAL LETTERS AND PUNCTUATION

TIME—10 MINUTES

In the sentences below some capital letters and punctuation marks have been left out. There may be more than one in each sentence. Read the sentences carefully. Put in any punctuation marks that are left out. Where a capital letter is needed write it ABOVE the word.

Like this :

1. peter jones is absent

P J
Correct : ~~p~~eter ~~j~~ones is absent.

2. Where is the boys cap.

Correct : Where is the boy's cap ?

1. the birds sing in the trees
2. If you come with me i will go
3. where have you been
4. Have you seen smith
5. some french people live next door to us.
6. Shall we visit you on monday
7. I bought apples oranges bananas and nuts
8. you and mary may gather flowers in the woods
9. The grocer sells eggs butter bacon and cheese.
10. The australian players sailed on the " queen mary " yesterday.
11. Tom went into dr. Young's garden dug a hole put in the apple tree and pressed the earth firmly round the stem.
12. London, the capital of england, is on the River thames.
13. I wish Alice would come said mrs. Jones.
14. I gave away jack's ball but i still have his bat.
15. Charles Dickens, the english author, wrote " oliver twist."
16. At christmas i am going to stay at sir Edmund's house.

[GO ON TO THE NEXT PAGE

17. Is Dr. L morton going to live here next april ?

18. Mother said always eat some fruit with your breakfast, John.

19. Tom lives in murray st with some dutch people.

20. Having climbed to the top of the tree i waved my handkerchief gaily.

21. Jane you must hurry said her mother, or you will be late for school.

22. He was I understand at the top of his class.

23. Was professor S Linden here before easter ?

24. If its hot we shall take Doras swimming suit.

25. Mrs. Hunt our new teacher lived in Baker Rd last year.

26. We shall not have drawing to-day said the teacher. we had it yesterday.

27. Bradman the famous cricketer could not play in the final match as he had hurt his leg.

28. Bill doesnt like the new poem because he prefers poems about soldiers.

29. " You mischievous boys just look what youve done to the ladies hats," said Auntie.

30. This bicycle which I bought in London is for John as to-morrow is his birthday.

31. " Beware " cried the man. " That dog bites."

32. Id like to see the boys school for I hear it is a fine building.

33. To grow sweet peas proceed thus make a trench dig in some manure place the seeds at equal intervals and then cover with a little soil.

34. " Ah " exclaimed the policeman. " What have you there, my lad "

35. To make cakes we use the following flour, sugar, eggs and butter.

36. What have you done with the childrens books ?

TEST 3—**VOCABULARY**

TIME—8 MINUTES

Draw a line under the word or words which BEST show the meaning of the word in CAPITAL LETTERS.

Like this :

(i) A PARROT is a kind of . . . animal, bird, town, mouse.

(ii) SILENT means . . . . . happy, good, slow, quiet.

(iii) To POLISH means . . . . to wash, to scrape, to mend, to shine.

NOW DO THESE

1. A ROOF is the top of . . . a house, a chimney, a tree, a cupboard.
2. SWIFTLY means. . . . . firstly, quickly, early, brightly.
3. To EXCUSE is . . . . . to be late, to cry, to go fast, to pardon.
4. A DUNGEON is a kind of . . fish, machine, prison, storm.
5. DROWSILY means . . . . homely, sleepily, busily, greedily.
6. RICH means . . . . . wealthy, proud, grand, busy.
7. IMMEDIATELY means . . . shortly, at once, suddenly, surely.
8. To DISCOVER means. . . . to understand, to see, to find, to fix.
9. CHEERFULLY means. . . . crossly, sweetly, softly, pleasantly.
10. SILLY means . . . . . foolish, naughty, clumsy, wrong.
11. To ENQUIRE means . . . . to say, to ask, to thank, to give.
12. QUIETLY means . . . . without light, slowly, easily, without noise.
13. A THERMOMETER is used to test . rainfall, medicine, temperature, temper.
14. TERROR is . . . . . . fear, hatred, unhappiness, ugliness.
15. AWKWARDLY means. . . . badly, heavily, quaintly, clumsily.
16. AN EXHIBITION is . . . . a statement, a display, a punishment, a sale.
17. GAIETY means . . . . . feast, dance, balloon, merriment.
18. To GOVERN means . . . . to rule, to teach, to love, to nurse.
19. A REPLY is . . . . . a return, a question, an answer, a paper.
20. To INFORM is . . . . . to make, to tell, to dress, to drill.
21. GRIEF means . . . . . sorrow, joy, tears, quarrel.
22. To DEMOLISH means . . . to publish, to chew, to destroy, to remove.
23. TIMIDLY means . . . . gently, cleverly, politely, shyly.
24. A RUDDER is part of . . . a sledge, a boat, a shop, a bus.
25. COURAGEOUS means . . . brave, strong, sturdy, stupid.
26. DELIGHT means . . . . brightness, sadness, pleasure, welcome.

[GO ON TO THE NEXT PAGE

27. To SAFEGUARD means	to signal, to satisfy, to drive, to protect.
28. A HANGAR is used for	ships, aeroplanes, clothes, bicycles.
29. OBSTINATE means	spoilt, impudent, stubborn, right.
30. REFUGE means	shelter, consent, refusal, rubbish.
31. To IGNORE means	to surpass, to crunch, to lack, to disregard.
32. POVERTY means	dirtiness, thirst, poorness, distress.
33. RECENTLY means	soon, lately, rapidly, always.
34. A VERDICT is	a disease, a promise, a problem, a decision.
35. USUALLY means	generally, never, rarely, sometimes.
36. To ASCEND is	to slide, to go down, to go up, to ride.
37. ACCURATELY means	carefully, carelessly, tidily, exactly.
38. GRATEFUL means	thankful, generous, mean, helpful.
39. To RECOLLECT means	to gather, to steal, to remember, to organise.
40. ORIGIN means	mouth, native, drink, source.
41. To be MELANCHOLY means to be	quarrelsome, sad, ugly, frightened.
42. To PROCLAIM means	to bestow, to shout, to announce, to claim.
43. RELUCTANTLY means	unwillingly, unavoidably, forcibly, eagerly.
44. To SEVER means	to sieve, to separate, to subdue, to sell.
45. To be FATIGUED means to be	hungry, ill, tired, alert.
46. To PERSECUTE means	to chase, to plunder, to illtreat, to embezzle.
47. MEEK means	humble, delicate, bold, weak.
48. To PREDICT means	to pray, to dictate, to prepare, to foretell.
49. DOUBT means	duty, distrust, thought, double.
50. To THWART means	to obstruct, to construct, to guide, to borrow.
51. CONCEITED means	pretty, nasty, vain, rich.
52. TOTALLY means	lastly, finally, decidedly, completely.
53. ILLEGIBLE means	unreadable, unusual, untidy, unwise.
54. ANARCHY means	religion, famine, lawlessness, explosion.
55. CELEBRATED means	national, famous, talented, magnificent.
56. ALLEGIANCE means	league, giant, suspicion, loyalty.
57. COPIOUSLY means	well, friendly, abundantly, efficiently.
58. TRANQUILLITY means	simplicity, peacefulness, glory, softness.
59. A TYRANT is	a despot, a soldier, a governor, a tourist.
60. To FLUCTUATE means	to pant, to flaunt, to digest, to waver.

TEST 4—SENTENCE STRUCTURE

TIME—15 MINUTES

Printed below you will find groups of 2 or 3 or 4 simple sentences. Make the sentences in each group into ONE complete sentence in the best and most sensible way you can. Write one complete sentence for each group.

Here are two examples to show you what to do:

Group A.
(i) He fell into the ditch.
(ii) The night was dark.

ONE sentence: He fell into the ditch because the night was very dark.
or The night was very dark when he fell into the ditch.

Group B.
(i) Snow was falling fast.
(ii) Jim drove the cows into their sheds.
(iii) Jim left the farm.

ONE sentence: Before leaving the farm Jim drove the cows into their sheds, for snow was falling fast.
or As snow was falling fast, Jim drove the cows into their sheds before he left the farm.

NOW DO THESE (Remember, on this paper write **ONE** complete sentence for each group of sentences).

Group 1. (i) I returned at ten o'clock.
(ii) I was surprised to find Mary still there.

....

....

Group 2. (i) He is wealthy.
(ii) He is not proud.

....

....

Group 3. (i) Tom Hunter was a young cabin boy.
(ii) Tom Hunter saved the ship.
(iii) The ship was in danger of striking a rock.

....

....

....

[GO ON TO THE NEXT PAGE

Group 4. (i) Mother and I went to the circus.
(ii) We saw many animals.
(iii) They were clever animals.

Group 5. (i) Bees visit flowers.
(ii) They go in search of nectar.
(iii) The bees get the nectar with their long, sucking tongues.

Group 6. (i) Three aeroplanes flew over the Channel.
(ii) Each aeroplane carried two observers.
(iii) The observers used telescopes.
(iv) They were searching for the missing ship.

Group 7. (i) The " Queen Mary " sailed for America.
(ii) The " Queen Mary " sailed last week.
(iii) There were many passengers on board.
(iv) John Martin, Professor Smith and Sir Thomas Inch were on board.

TEST 5—**COMPOSITION**

Write a composition on "**HOME.**" YOU WILL HAVE 30 MINUTES.

[Alternatively the teacher or psychologist may prefer to give the topic "What I do on Saturdays and Sundays" (for ages 7+ and 8+), or "Saturdays and Sundays" (for ages 9+ to 14+). Time allowed 30 minutes.]

For median samples of composition on "Home" for age groups 7 to 13, see pages 151-154; for median samples on Saturdays and Sundays, see pages 159-161.

ANSWERS AND INSTRUCTIONS FOR DIAGNOSTIC ENGLISH TESTS

TEST 1. ENGLISH USAGE

Time—10 *minutes*

Marking and Scoring. Total Score—54 marks

One mark is given for each sentence correctly completed. As we are testing level of English usage and not spelling, pupils are not penalised for spelling errors unless the mis-spelling is a quite incorrect form of the word. Mark an answer correct when the word written can be recognised as the correct form. For example :—

No. 11. " lieing " (lying) would be marked correct.
No. 25. " heavyer " (heavier) would be marked correct.
No. 17. " drownd " or " dround " would be allowed, but " drownded " would be counted *incorrect.*

In marking questions numbered 26 to 54 one finds occasionally that pupils have consistently underlined or marked the incorrect form. If it is apparent that such testees know the answers, but have followed a wrong procedure, count such underlinings as correct. Similarly, if pupils have written the correct forms in numbers 26 to 54 instead of underlining, allow marks for each of the correctly written answers.

ANSWERS TO TEST 1. ENGLISH USAGE

1. seen
2. most
3. tallest
4. were
5. may
6. himself
7. came
8. haven't
   have not
9. an
   one
10. were
11. lying
12. who
    that
13. were
    waited
14. worse
15. rang
16. caught
17. drowned
    drowning
18. I
19. drew
    draws
20. written
21. did
22. drunk
23. is
24. begun
25. heavier
26. their
27. rises
28. gone
29. broken
30. is
31. doesn't
32. anything,
33. torn
34. teach
35. used
36. that
37. known
38. were
39. anything
40. swam
41. slowly
42. can
43. I
44. lain
45. has
46. that
47. looks
48. his
49. was
50. me
51. is
52. we
53. was
54. his

ANSWERS TO TEST 2. CAPITAL LETTERS AND PUNCTUATION:

The corrections in each sentence are given in black type.

Marks	*No.*
2	1. **The** . . . . trees.
2	2. . . . . **I** will go.
2	3. **W**here . . . . been **?**
2	4. . . . . **S**mith **?**
2	5. **S**ome **F**rench . . . .
2	6. . . . . **M**onday **?**
3	7. . . . . apples**,** oranges**,** bananas and nuts**.**
3	8. **Y**ou and **M**ary . . . . woods**.**
2	9. . . . . eggs**,** butter**,**
3	10. The **A**ustralian . . . . **" Q**ueen **M**ary **"** . . . .
3	11. . . . . . **Dr** . . . . . . garden**,** dug a hole**,** . . . .
2	12. . . . . **E**ngland . . . . . . **T**hames.
4	13. **"** . . . . come**,"** said **M**rs. . . .
3	14. . . . . **J**ack's ball**, I** . . . . .
3	15. . . . . **E**nglish . . . . **O**liver **T**wist
3	16. . . **C**hristmas **I** . . . . . **S**ir . . . .
3	17. . . . . . **L. M**orton . . . . . . **A**pril
4	18. . . . . . . said**, "A**lways . . . . John **"**
4	19. . . . . . **M**urray **St.** . . . . . **D**utch . . .
2	20. . . . . . . tree**, I** . . . .
6	21. **"** Jane**,** . . . hurry**,"** . . . **"** or . . . school **"**
2	22. . . . . . was**,** I understand**,** . . . . .
3	23. **P**rofessor S. . . . . . . **E**aster
2	24. . . . . it**'**s . . . . Dora**'**s . . .
3	25. . . . . Hunt**,** . . . . . teacher**,** . . . . . Rd**.** . . .
6	26. **"** We . . . to-day**,"** . . . . **" W**e . . . . yesterday**."**
3	27. Bradman**,** . . . . cricketer**,** . . . . . match**,** . . . .
2	28. . . . . doesn**'**t . . . . poem**,** . . . .
3	29. . . . . boys**,** you**'**ve . . . . . ladies**'** . . . .
3	30. . . . . bicycle**,** . . . . London**,** . . . . John**,** . . . .
1	31. Beware **!**
3	32. I**'**d . . . . boys**'** . . . . . . school**,** . . . .
3	33. . . . thus **:** (or **—**) . . . trench**,** . . . manure**,** . . .
2	34. Ah **!** . . . . lad **?**
1	35. . . . . following **:** (or **—**) . . . . .
1	36. . . . . children**'**s . . . .

TEST 3. VOCABULARY

Detailed Directions. Say to the testees, " Turn to Test 3, page 8." (See that all have the correct place.) " This is an easy test; it is a test of the meanings of words. I shall show you what you have to do. Follow the directions as I read them."

The instructions in black are then read aloud slowly to the testees. Next the three examples are read aloud, and on each occasion testees are asked to suggest the answer. Allow testees to underline the correct word in example (iii).

Say, " Do you understand what to do? All you have to do is to *underline* the correct word. Don't guess, but work quickly and carefully. Are you ready? Start."

Time—8 minutes

Marking and Scoring. Total Score—60 Marks

One mark is given for each word correctly underlined

A few younger pupils write the correct word either in the space at the beginning or at the end of the words. Watch to see that this does not occur, but give credit for any correct answers so written.

ANSWERS TO TEST 3. VOCABULARY

1. house
2. quickly
3. to pardon
4. prison
5. sleepily
6. wealthy
7. at once
8. to find
9. pleasantly
10. foolish
11. to ask
12. without noise
13. temperature
14. fear
15. clumsily
16. a display
17. merriment
18. to rule
19. an answer
20. to tell
21. sorrow
22. to destroy
23. shyly
24. boat
25. brave
26. pleasure
27. to protect
28. aeroplanes
29. stubborn
30. shelter
31. to disregard
32. poorness
33. lately
34. a decision
35. generally
36. to go up
37. exactly
38. thankful
39. to remember
40. source
41. sad
42. to announce
43. unwillingly
44. to separate
45. tired
46. to ill-treat
47. humble
48. to foretell
49. distrust
50. to obstruct
51. vain
52. completely
53. unreadable
54. lawlessness
55. famous
56. loyalty
57. abundantly
58. peacefulness
59. a despot
60. to waver

TEST 4. SENTENCE STRUCTURE

SCHEME OF MARKING

Allow for groups 1 and 2 a total of 3 marks for each complete sentence in which the simple sentences are correctly joined.

Allow for groups 3, 4 and 5 a total of 5 marks for each complete complex sentence in which the simple sentences are correctly joined or embodied.

Allow for groups 6 and 7 a total of 7 marks for each complete complex sentence in which the simple sentences are correctly joined or embodied.

PRINCIPLE OF MARKING

(1) 1 mark for each simple everyday joining, *e.g.* using " and " or " but." If the joining word " and " is used more than once it scores only 1 mark.

(2) 2 marks for less common conjunctions, *e.g.* the use of " who," " which," " because," " although."

(3) 1 extra mark for an inversion which improves the sentence.

(4) 1 extra mark for a simple sentence changed to an adjective, adverb or an adjectival or adverbial phrase, or phrase in apposition.

(5) 1 extra mark for an especially suitable form of expression which lends emphasis, provides balance or ensures clarity.

(6) Credit is given for partly correct sentences, *e.g.* the following result would be awarded 1 mark :—

> Tom Hunter was a young cabin boy *and* [1] he saved the ship. The ship was in danger of striking a rock.

or 2 marks :—

> Tom Hunter was a young cabin boy who [2] saved the ship. The ship . . .

Below is given a specimen set of sentences from the various groups to illustrate the principle of marking. A full list of possible joinings in each group with their respective marks is given on pp. 16-22 of the *Handbook for the Schonell Diagnostic English Tests.*

SPECIMEN SET OF SENTENCES WITH MARKS

Marks

1 I returned at ten o'clock and [1] was surprised to find Mary still there.
2 When (as) [2] I returned at 10 o'clock I was surprised to find Mary still there.
3 In spite of (despite) [3] his wealth he is not proud.
4 Tom Hunter was a young cabin boy who [2] saved the ship which (that, when it) [2] was in danger of striking a rock.
5 Tom Hunter, a young cabin boy, [3] saved the ship when [2] it was in danger of striking a rock (extra mark for phrase in apposition).
5 There were many clever [3] animals at the circus to which [2] Mother and I went. (extra mark for sentence changed into adjective).
6 Three aeroplanes flew over the Channel each carrying [2] two observers using (who used) [2] telescopes to search [2] for the missing ship.
7 When [2] the "Queen Mary" sailed for America last week [2], John Martin, Professor Smith and Sir Thomas Inch were among [2] the many passengers. [S+1].

S+1 means 1 additional mark for the general balance or style of the completed sentence.

NORMS FOR DIAGNOSTIC ENGLISH TESTS

TABLE XXIII

TEST 1. ENGLISH USAGE

SCORES AND EQUIVALENT ENGLISH AGES

SCORE	ENGLISH AGE YRS.	ENGLISH AGE MTHS.	SCORE	ENGLISH AGE YRS.	ENGLISH AGE MTHS.	SCORE	ENGLISH AGE YRS.	ENGLISH AGE MTHS.	SCORE	ENGLISH AGE YRS.	ENGLISH AGE MTHS.
11	8	0	22	9	9	33	11	11	44	13	8
12	8	2	23	10	0	34	12	1	45	13	10
13	8	4	24	10	3	35	12	4	46	14	0
14	8	6	25	10	6	36	12	6	47	14	2
15	8	8	26	10	8	37	12	8	48	14	4
16	8	9	27	10	10	38	12	9	49	14	6
17	8	11	28	11	0	39	12	11	50	14	8
18	9	1	29	11	2	40	13	1	51	14	10
19	9	3	30	11	4	41	13	3	52	15	0
20	9	5	31	11	6	42	13	4	...	...	
21	9	7	32	11	8	43	13	6	...	...	

TABLE XXIV
TEST 2. CAPITAL LETTERS AND PUNCTUATION
SCORES AND EQUIVALENT ENGLISH AGES

SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
17	8	0	32	10	2	47	12	0	62	13	10
18	8	2	33	10	4	48	12	2	63	13	11
19	8	4	34	10	5	49	12	3	64	14	0
20	8	6	35	10	6	50	12	4	65	14	1
21	8	8	36	10	8	51	12	6	66	14	2
22	8	10	37	10	9	52	12	8	67	14	4
23	9	1	38	10	11	53	12	9	68	14	5
24	9	4	39	11	0	54	12	11	69	14	6
25	9	6	40	11	2	55	13	0	70	14	7
26	9	7	41	11	3	56	13	2	71	14	8
27	9	8	42	11	5	57	13	3	72	14	10
28	9	10	43	11	6	58	13	5	73	15	0
29	9	11	44	11	8	59	13	6	...	...	
30	10	0	45	11	9	60	13	7	...	...	
31	10	1	46	11	11	61	13	8	...	...	

TABLE XXV
TEST 3. VOCABULARY
SCORES AND EQUIVALENT ENGLISH AGES

SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
14	8	0	23	10	0	32	11	4	41	13	0
15	8	3	24	10	2	33	11	6	42	13	3
16	8	6	25	10	4	34	11	8	43	13	6
17	8	9	26	10	6	35	11	10	44	14	0
18	9	0	27	10	8	36	12	0	45	14	6
19	9	3	28	10	9	37	12	2	46	15	0
20	9	6	29	10	11	38	12	4	...	...	
21	9	8	30	11	1	39	12	6	...	...	
22	9	10	31	11	3	40	12	9	...	...	

TABLE XXVI
TEST 4. SENTENCE STRUCTURE
SCORES AND EQUIVALENT ENGLISH AGES

SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE		SCORE	ENGLISH AGE	
	YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.		YRS.	MTHS.
3	8	0	10	10	6	17	11	10	24	13	9
4	8	6	11	10	8	18	12	2	25	13	11
5	9	0	12	10	10	19	12	6	26	14	1
6	9	6	13	11	0	20	12	9	27	14	4
7	9	9	14	11	2	21	13	0	28	14	6
8	10	0	15	11	4	22	13	3	29	14	9
9	10	3	16	11	6	23	13	6	30	15	0

VIII. MEDIAN SAMPLES OF WRITTEN COMPOSITION

AS has been stated in chapter III, one of the best means of assessing the level of written English, into which both objective and subjective elements enter, is that of the median sample. Below are given median samples for each of the age groups 7+ to 13+ years for three different types of composition, namely, (*a*) narrative—descriptive, (*b*) imaginative, and (*c*) explanatory. In addition there is a supplementary set of median samples of the narrative-descriptive type on the topic "Saturdays and Sundays," a subject similar in appeal and scope to that of "Home," about which the first set of compositions were written. These comparable sets of median samples, for the age range 7+ to 13+, on topics of a similar kind are given to help and validate the work of schools which are using median samples for recording attainments in English compositions for school record cards. To reduce the effect of any practice factor we would suggest the use of the topic "Home" for the first year's records, "Saturdays and Sundays" for the second year's records, with a similar alternation for the third and fourth years.

For writing each composition a time limit of 30 minutes is allowed. The following conditions should be carefully observed if the median samples are to be a valid measure for assessing pupils and for comparing different children in different classes or schools in different areas.

INSTRUCTIONS

In writing the composition few specific directions should be formulated. The title is written on the blackboard and the time limit is announced. A warning is given five minutes before the end of the time. Pupils of 7 and 8 years are allowed to write in pencil. No remarks are made, no injunctions given, no suggestions put forward, no questions answered and no words spelled—any and all of which procedures can, if not strictly observed, distract the child from his own ideas to those of other people. Only in the case of "How to play . . ." are explanations made; then pupils are told to select *any* game they like and to write about it. It is emphasised that they must write on only one game.

For the alternative narrative-descriptive title "Saturdays and Sundays," a slight modification to "What I do on Saturdays and Sundays," which makes it more direct for younger pupils is allowed for pupils of ages 7 and 8+ and for backward ones of 9+.

Marking

In marking the compositions every effort should be made to preserve uniformity and objectivity. Experience shows that this is best done if assessors are guided by a marking schedule. It is not suggested that in using the following schedule examiners should laboriously give three separate marks for the three aspects of the composition, but they should be conscious of the three aspects and their relative values in making their final assessment. That is, they should mark by general impression guided by the schedule.

Marking Schedule

A.—Content of Composition . . . . Clearness and continuity of thought ; originality of ideas and extent of vocabulary.	12 marks
B.—Structure of the Composition . . . . Variety and correctness of sentence structure ; and, where it applies, paragraphing and general unity.	7 marks
C.—Mechanical Accuracy of the Composition . . . . Spelling, punctuation and mechanical accuracy.	6 marks
Total	25 marks

Hints to Markers

It is suggested that before marking any set of written compositions those of children of the same chronological age group should be put together and read as a group. This will enable the marker to preserve a basis of comparison within the age group, a fact that is of importance in finally determining to which median sample each composition approximates.

Where a number of teachers are marking compositions for purposes of record card entries, it is advisable for each teacher to mark six compositions, which are read in turn by all other markers. Deviations in marking are then discussed and attempts made to standardise the marking as a whole. Where possible it is helpful if two or three teachers on a large staff make themselves responsible for the annual composition marking for the record cards—this decreases the variability of marks.

In the final marking, which may in the first place take a numerical form, it is useful to add plus or minus to the median sample, so that in this way we get three gradings within each age group, providing us with what might be termed a 21 point scale, rising from the lowest composition assessment of $7\frac{1}{2}-$ years to one of $13\frac{1}{2}+$. For guidance in the addition of plus and minus signs to compositions within each group we may note the following :—

Scores 12, 13 represent a median sample for the age group.
Scores 10, 11 represent an attainment slightly *below* median sample.
Scores 14, 15 represent an attainment slightly *above* median sample.

The average standard deviation for all groups for the compositions is approximately 5, so that the range of scores 10 to 15 represents $-\frac{1}{2}\sigma$ to $+\frac{1}{2}\sigma$ about the mean and will include roughly 53 per cent. of a normal distribution of cases.

Thus scores of *under* 9 *and over* 15 will in all probability enter other age groups. A 9 year old pupil scoring only $\frac{8}{25}$ on a composition is likely to have attainments more like the average 8 year old pupil, while one scoring 22 or 23 marks will approach the average 11 year old standard—this overlap is particularly characteristic of written composition and represents variations up to 20 marks.

Thus our final marking guide may be arranged as follows :—

SLIGHTLY BELOW MEDIAN SAMPLE FOR AGE GROUP	MEDIAN SAMPLE FOR AGE GROUP	SLIGHTLY ABOVE MEDIAN SAMPLE FOR AGE GROUP
Scores $\frac{10}{25}$, $\frac{11}{25}$ $(-\frac{1}{2}\sigma)$	Scores $\frac{12}{25}$, $\frac{13}{25}$	Scores $\frac{14}{25}$, $\frac{15}{24}$ $(+\frac{1}{2}\sigma)$
$7\frac{1}{2}-$	$7\frac{1}{2}$	$7\frac{1}{2}+$
$8\frac{1}{2}-$	$8\frac{1}{2}$	$8\frac{1}{2}+$
$9\frac{1}{2}-$	$9\frac{1}{2}$	$9\frac{1}{2}+$
$10\frac{1}{2}-$	$10\frac{1}{2}$	$10\frac{1}{2}+$
$11\frac{1}{2}-$	$11\frac{1}{2}$	$11\frac{1}{2}+$
$12\frac{1}{2}-$	$12\frac{1}{2}$	$12\frac{1}{2}+$
$13\frac{1}{2}-$	$13\frac{1}{2}$	$13\frac{1}{2}+$

Care should be taken in marking to give adequate marks to really good compositions. Thus 21, 22, or even 23 should not be an unattainable mark for very good compositions in any age group.

MEDIAN SAMPLES

NARRATIVE-DESCRIPTION TYPE OF COMPOSITION

Subject—" Home "

Below are given the median attainment levels for age groups from 7-8 to 13-14 years.

SCHEDULE

Median Samples of Narrative Type of Composition for Age Groups 7+ to 13+ years

Age Group 7-8. Composition Age 7½.

Home

I have a kat in my Home. I got a babe at Home. I am gowing to the shops on Satday. I sleep in a bed at Home. I am gowing to the park on Sunday.

Age Group 8-9. Composition Age $8\frac{1}{2}$.

Home

I have a brother at home and he gives me pennys. Sume-times I help my mother to wash-up. Evry sunday my sister takes me out for a walk. And I do evrything mother tells me to do. A little girl lives down my street and I teach her to be kind. I have five rooms in my house. I went to see my auntie last Saterday. And I took my doll and pram. I go to bed ealy evry night. I have a cat.

Age Group 9-10. Composition Age $9\frac{1}{2}$.

Home

At home I have some toy which I play with, and some books which I read on winter nights. At we have chairs which we sit on to have tea and dinner we have to have a table because we would not be able to have our meals. At home I have a dog and when we are eating he sits up because he wants some to and so we give him something to eat. We have some picturs round the wall. On firework night at home we will have some fireworks. Sometimes I go my cousins house to play draughts and snaks and ladders. My house is not very far from the school where I go.

Age Group 10-11. Composition Age $10\frac{1}{2}$.

Home

Home is a very pleasent place espiacially when it is night time. Until quarter past eight I do knitting and reading. At half past four when I have been home from school mother will not let me go out to play because it gets dark quickly.

After meals I wash up excepting at breakfast time. In the winter time it is very nice to be home quickly and get snuggled in a book by the fireside.

I often get the baby to sleep by humming him a little tune and rocking him in my arms. Sometimes it makes my arm ache as he leans againts it.

At home when I am washing up I always sing. Our stove is in the kitchen so that in the winter not only the fire can give heat but the stove too.

Mother has nine children and I am the second from the youngest. Three children go to work, the others excepting for one go to school.

Age Group 11-12. Composition Age $11\frac{1}{2}$.

Home

I live at eighteen S—— Road ——, B——. My home is a home which as soon as I get in the door every-thing seems to welcome me. My little sister runs to the kitchen door to meet me, my little kitten comes and rubs up against me.

We have four rooms and a scullery. One is a kitchen, another a sitting room, and two of them are bedrooms.

We have a lovely fire every day in the Winter. On every room is not a speck of dirt to be seen for my mother and father are very particular.

The scullery is a fairly large sized room but the kitchen is the largest room we have, the room that is nearly as big as the kitchen is the front room which is a bedroom. The other bedroom is a small room. We also have a garden with a different kinds of flowers in it, while there is a railway at the back of us. The railway is a very busy one for every day hundreds of trains run along it.

Age Group 12-13. Composition Age 12½.

Home

Where I live facing the park the wind goes through the trees with a howl. When you have been out you come back home and rest. We have in our house one kitchen, two bedrooms, one parlour and a fairly big garden and the scullery. We are now having electric lights down the street for the people who need it and we are one of them.

The homes could be made more cheerful in London by the flowers in the garden but the place being surrounded by factories makes the earth black and the flowers cannot grow so well.

At the back of our garden we have a tar factory, it is very useful in some ways, but other times we wish it was not there. One reason why it is useful is because a little boy next door had hoopin cough and when he was allowed to get up he used to sit on the balcony and when the men were melting the tar it helped him to get better.

Age Group 13-14. Composition Age 13½.

Home

Everybody should consider homes as there best place because there are a good many people without a home to live in. People now-a-days are even grumbling because they cannot make there homes look nice without thinking of some people without homes at all. My house is situated in N—— where I have lived all my life, and I think it must be unpleasant without a house to live in. In the summer people are nearly always out, but in the winter nearly everybody wants to keep in, but some poor people have to roam about and sleep in the streets.

In England we ought to be thankful for in other countries they have earthquakes which destroy houses. People can see what some children have to bear when they have to go to orphanages. If we are out we sometimes wish to be indoors and some people express it as "Home Sweet Home." As most of us at school have got a home to live in I think we should all strive and make our homes comfortable and enjoyable where anybody could live.

IMAGINATIVE TYPE OF COMPOSITION

Subject—"If you had wings and could fly, tell what you would do."

Below are given the median attainment levels for age groups from 7-8 to 13-14 years.

SCHEDULE

Median Samples of Imaginative Type of Composition for Age Groups 7+ to 13+ years

Age Group 7-8. Composition Age 7½.

If I had wings and could fly. I would fly over the houses and fly over fensis. I would fly in the play in the playground and fly home to my mother and father and have my dinner and fly to scool.

Age Group 8-9. Composition Age 8½.

If I had wings I would fly about in the sun-shine and play in the fields. I would fly over the tree tops high in the air. I could fly with the birds in the air every day.

I would play among the fiaries in the field too. If I where a fairy I would teach the rabits how to play games in the sun. I would play hide-in-seek round the trees in the wood. And I would be able to see all the little baby birds in there nest in the trees. I would fly and get my mothers erands every day.

Age Group 9-10. Composition Age 9½.

If you had wings and could fly what would you do ?

If I had wings I would fly over the sea and see all the fish's in the water.
Then I could fly to school. I expected at first I would for-get they were
on me, but I wonder how I would go to bed with them on. I have never
seen anyone with any on but I would laugh if I did. But if I did have a pair,
I would fly to Africa to see the black boys and girls. I would ask them if they
would lend me some of their spears to show the boys in my class. Then I
would fly over to Ceylon to get some of their tea if they'v got any to spear.
When I am over there the first thing I shall see is some bungalo's. Then I
shall fly over to Scotland to see the kilts.

Age Group 10-11. Composition Age 10½.

If I had wings and could fly

If I had lovely gauzy wings I would soar right up into the sky and alight perhaps in quite a different place.

It is a very cheap way of travelling because you don't have to pay. The first place I would go to would be a thick dence forest with trees knotted all over the place, the reason is because if any of my friends come with me we can have a game of hiding seek and hide in the hollow of a tree and we might even find a tresure box hidden in the branches.

The next place I would go to would be switserland where all the snowy mountains are, but I want to know how to get there. First I will go to the sea coast and follow a ship which says Going To Switserland. I fly after it and if I get tired I will board the ship when no one was looking. When I had recovered my breath I would start of again.

Age Group 11-12. Composition Age 11½.

If I had wings and could fly

If I had wings and could fly, I would fly into the country where I had never been before. I would go to the woods, and fly into the branches of the trees. I would stand on top of the hedges, I would fly to the lonely moors where I would pick the wild flowers, and then fly back to the dusty streets of London and plant them in the gardens to make the roads and streets look pretty. It would be wonderful to have wings and be like a bird to fly up in the sky. If I had enough strength I would fly on top of the alps to see the beautiful sights. I would stay until the sunset to see the snow on the mountains turn white to red. Nearly every day I would visit the sea and do all the movements the gulls do, glide along the water and also enjoy the spray which the motor boats make.

Age Group 12-13. Composition Age 12½.

If I had wings

If I had wings and could fly faster and farther than an earoplane I should want to know what Mars was like. I should fly and fly till it was cold and I needed Oxegyn. I would have to come down because I would not be able to breathe and I should not like to die in midair.

Next I'd fly to Africa and as I went along Cape Town I would pick grapes to last me till I was tired of Africa. Then I would go to the pigmies and see them shoot with their poisoned arrows.

I have always had a secret longing to go to Arabia and see the Arabs on horseback riding through the desert under a stary sky. But now if I had wings it would be far more exciting to be able to fly all the way than to just go by boat.

One more place I would like to visit is Holland to have a skate on the frozen canals and see the windmills.

Age Group 13-14. Composition Age 13½.

My Wings

If I had wings and could fly I should fly to Honalulu. I have heard that the native men are very strong and the girls very beautiful.

When I arrived I should like six leis put round my neck by the native men and girls. Every morning I should go surf riding on the Pacific Ocean, until about nine o'clock in the morning. After that I should rest on the sands and bask in the sun, I would stop in my hotel until midday is passed because it is so hot and the sun might scorch my wings. At about four o'clock I should go for a fly round the islands and have a swim with my native friend and return at dusk. When the moon is high and the natives are strumming their guitars I should get one to come in a boat with me on the Pacific with his guitar.

After spending the evening on the water I should fly back to my hotel to bed. Next day I should do the same. If my wings were stiff from want of use I should take more exercise.

A fly round the world couldn't be half so exciting as my Honalulu holiday.

EXPLANATORY OR EXPOSITORY COMPOSITION

Subject—" How to play ——— " (a game)

Below are given the median attainment levels for age groups from 7-8 to 13-14 years.

SCHEDULE

Median Samples of Explanatory Type of Composition for Age Groups 7+ to 13+ years

Age Group 7-8. Composition Age 7½.

A Game

I play Jamans ereraplans and ingland ereraplans there are six on to Four we chas one anver and wen we are calt we are put in to prisern then some one come and gets us away frome prisern then we run away.

Age Group 8-9. Composition Age 8½.

How to Play Mothers and Fathers

Shall we play at mothers and fathers to night ? Yes. Then Irene can be baby and Jean can be father and I can be mother. Irene can sit in babies pramulater. She can wear her shawl and bonet if it will fit you. Jean can wear Daddies hat and over-coat. I can wear Mumies apron and dusting cap. Now I think we can start the game. First of all baby must her supper and go to bed I think you and I can go to pictures. Now baby must be washed and carried up to bed.

Age Group 9-10. Composition Age 9½.

How to play hide and seek

This is a game that children can play in the winter when it is very cold. One of the children have to hide there eyes and the others have to hide away somewhere. When the people hide they call out ready, and the child looks and when he finds him he has to call out and say caught and he has to be it. This is a game that must be played fairly and no one must cheat. If you when it is your turn to hide your eyes you must not look to see if the children hide, if you do you are a cheat. You can not have two children you must have about eight or nine.

Age Group 10-11. Composition Age 10½.

How to play Releaser (a game)

This is how to play a game of Releaser. First of all there has to be two equal sides. Then two leaders pick up to see which side has to run out and hide. Then the other side tries to catch them there has to be one man in the "pot." If one of the Hiders are caught they stands in the "pot."

If one of the hiders are not caught he tries to get in the "pot" and touch the one caught. If he does he shouts "Releaser." When one of the seekers catches the hider, he tries to hit him on the head and say, "One, two, three, crown him."

The one who catches the hider cannot have him unless he the hider has not got his hands upon his head. If he has his hands upon his head, another one of the seekers takes his hands off of his head and haves him.

Age Group 11-12. Composition Age 11½.

How to play Joan of Arc

First of all you get five or six girls together. Then you chose one to be the speaker, she stands by the wall and the rest stand in front of her.

Then she says, "Joan of Arc wears stockings," and if any of the players wear stockings they run, and the one who wins is the speaker. But if the speaker says Joan of Arc wears falce teeth you must not run because you don't wears them. Sometimes they say "Joan of Arc looks beautiful" and you don't know whether to run or not. Other times they say "Joan of Arc looks ugly," sometimes the players run and other times are sensible enough not to run. When they say you dont wear anything it very silly to run.

To play the game well it is nesessary to think quickly and make up your mind to stand still or run hard.

Age Group 12-13. Composition Age 12½.

Ludo

Ludo is an indoor game. You have a big square piece of thick cardboard which has a square at each corner to put the counters in, one is coloured blue, another green, another yellow and the last red.

The highest number of players you may have is four, and each have four counters each.

One player takes the dice, and shuffles it, in an egg-cup or any other object required. If he throws a six he goes first, he takes one of the counters out of the square and has another go, and gradually he moves the counter round the board, in the squares, to which numbers he throws. The others do the same when they have thrown a six to start them off, and each player throws the dice in turn. If another player moves on to one of your counters you must take it back to the beginning and start again. The first one who reaches the home wins.

Age Group 13-14. Composition Age 13½.

Netball

Netball is a game taught in most schools as there are netball matches held between schools for a shield. It is a game played by fourteen girls, seven girls on each side. There is a centre and centre forward, shooter, defence shooter and two centre attacks on each side.

A coin is tossed and each side has a choice of heads and tails if it comes down tails, the side who said it, gets first innings or, choice of goals. The game starts with the ball in the hands of the centre. She throws it across to centre forward and centre attack tries her best to catch it. If she misses and centre forward catches it she passes on to the shooter or help shoot. Suppose shooter has obtained the ball, she then tries to get a goal, but sometimes she is unlucky and the ball bounces on to the ground again. Unluckily shooter defence gets hold of the ball and passes it to help shoot and over goes the ball to the other side, where the opposite shooter gets it. Up goes the ball and everyone shouts "Goal!" and it is one up for the other side. It is a very exciting game and keeps the players warm on a winter day.

NARRATIVE-DESCRIPTIVE COMPOSITION

Additional Median Samples

Topic—" Saturdays and Sundays "
" What I do on Saturdays and Sundays "
(Enlarged title for pupils of 7+ and 8+)

SCHEDULE

Median Samples on Narrative-Descriptive Type of Composition for Age Groups 7+ to 13+

Age Group 7-8. Median Age 7½.

What I do on Saturdays and Sundays

On Saturday I go to town. In the afternoon I go out. On Sunday I go to Sunday School and then I go out for a warlk. then I go home for tea. And I go to bed and go to sleep.

Age Group 8-9. Median Age 8½.

What I do on Saturdays and Sundays. On a Saturday I by a comic to read. And I play with my palls and sometimes we have ice crem. Sometimes I go to the picturs with my mother. On a Sunday I go to Sunday school in the afternoon. In the afternoon after I go to the park with my Brother and then I come home and I have my tea.

Age Group 9-10. Median Age 9½ years.

Saturdays and Sundays

On Saturday morning I go to the pictures, there are often long ques outside. There are pictures like Johny Mack Brown. The picture end at a quater past twelve. There are policemen outside waiting to tell the children when to cross the road. I walked home and could smell my dinner when I was walking in at the gate. We had meat, patatoes and sweed and apple tart for pudding. In the aftonoon my father took me and my brother out. We went down to the peir. We each had a try in the bumper cars. After that we came home for the time was half past four.

Age Group 10-11. Median Age 10½ years.

Saturdays and Sundays

On Saturday we have no school so I go to the pictures. After the pictures I go on mesegs for my Mother untill dinner time. After dinner I go on a hicke in the woods with my friend. We make a fire and boil a kettle of water which we get from a little stream near by. We make tea and sometimes if we are lucky we have an egg each off our Mothers. When we have had tea we go and play in the woods. We make dens in trees until we go home. And then we go down the swings for the rest of the afternoon. On Sunday afternoon I go to Sunday School at our Church. After wards my friend and I go down to the beach and catch eals. I once caught ten and let them go. When we come home we have tea with father and mother. After tea we go for a walk and pick flowers and come back quite tired and bed is very welcome.

Age Group 11-12. Median Age 11½ years.

Saturdays and Sundays

Every Saturday morning I go out shopping, and have to get the goods, and sometimes I have to queu for hours. When I come home I take my brother out for a walk. Then after dinner I walk down to our cub head quaters, and arrange a party to go hiking. We decide to go to the beach and catch the 2. o'clock train.

As we pass along we glanced at the shipwreck, one of us said it was a Light Creuser, and another said it was a Libity ship, and it had two 6 inch guns. We arrived at the beach, we walked up the steps of the castle and one of my pals looked across the bay and we saw a pilotship. We raced on to the beach, one asked, " Who's brought a foot ball ". " I have " said Gerald Jones. We had a game of football then we had tea and packed up.

On Sunday morning I go to our newsagent and fetch the paper, after that I take my sister and my brother for a stroll.

Age Group 12-13. Median Age 12½ years.

Saturdays and Sundays

Saturday is the last day of the week, and there is usually a hustling and bustling. There are far more people shopping on Saturday than there is with the other days of the week. Saturday is also a very noisy day, quite the opposite to Sunday. Buses are full, and you can see a lot of motor-cars and bicycles and some motor-bykes on Saturday, that go to town or are coming from town.

Sunday is a very quiet day and people don't seem in such a hurry. Everything seems calm and peacefull. You can see people going to church. Some get up early in the morning while others go in the night.

You can't buy anything on Sunday because the shops are shut. But some get a paper called Sunday Despatch and a few other papers. Even the streets on Sunday are quiet. Some people go to the park and have a sit down. Sometimes you hear the quiet buzz of the bees which settle on flowers.

Age Group 13-14. Median Age 13½ years.

Saturdays and Sundays

It was a bright Saturday morning when I woke up it was about eight o'clock. I genrally go to the pictures but as it was such a beautiful morning I stayed home to do the shopping for my Auntie.

It was about nine o 'clock when I was dressed and all ready to go. I took the bus which was practicaly empty but for one or two people. When I arrived at the village the streets were a real hustle and bustle. People hardly took any notice of you. The queus were tremendously long and the heat of the morning was getting hotter and hotter. People looked really tired after trying to get this and that.

The afternoon was a great heat wave and my friend and I went for a spin on our bikes, we often did that on a lovely day. We took lunch with us for we would get very hungry. We came back very tired after the afternoon's outing.

Sunday was a different day all together for the rain was pouring down. As I was looking through the window I could see the people hurrying along the wet pavement. In the afternoon the sun was peeping through the clouds, the sun made the trees look as if they had stars on them.

IX. GUIDE TO REMEDIAL MATERIAL FOR BACKWARD PUPILS[1]

THE books and cards referred to in the following list are not meant to represent an inclusive catalogue but merely to serve as a guide to those who have to select material for pupils whose scholastic attainments are markedly below their chronological ages.

The ages given refer, in all cases, to attainment or subject ages *not* chronological ages. Because of extra experience and maturity backward pupils will very often, when given effective remedial help in small groups, make much greater progress than normal pupils of similar attainment ages. For example it is not unusual for a backward reader of 8 or 9 years to make 1½ or 2 years of progress in reading in 6 months' remedial tuition in a special class—of course all that such pupils are doing is "making up lost ground," a recovery that many of them never make unless the opportunities in a small special class or adjustment group are provided. The relevant point from the foregoing in regard to the selection of remedial materials, especially in reading, is that of the necessity of providing sufficient well-graded material to enable the child to make this rapid progress when the opportunity arrives. For this reason while we may start a backward pupil of 8+, reading age 5+, with the first book in a first reading series, very soon we *may* have to let him move on to the second and even third books of the series. This explains why the number of books alloted to reading age levels in the following list differs from that outlined for pupils beginning reading in infant classes.

Reading Age

READING *

5+ *Happy Venture Readers*, Introductory Book, Books I and II (Oliver & Boyd).
To-day's Word Play Books Primer (Macmillan).
Beacon Readers, Introductory Book and Book I (Ginn & Co.).

6+ *Happy Venture Readers*, Book II and Book III.
Beacon Readers, Book II and Book III.
Escalator Reading Booklets, Grade C (Oliver & Boyd).
To-day's Word Play Books, Book I (Macmillan).

7+ *Happy Venture Readers*, Book III and Book IV.
Wide Range Readers, Books I and II (Oliver & Boyd).
New Vista Readers, Book I (Schofield & Sims).
Pathfinder, Book I, J. and P. Bradley (Oliver & Boyd).
Escalator Reading Booklets, Grade B.

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[1] For further guidance on material for reading see *The Psychology and Teaching of Reading*, pp. 124-125, F. J. Schonell (Oliver & Boyd), for a list of graded material with corresponding reading ages for backward senior boys and girls. Also see the *Teachers' Handbook* to *The Escalator Reading Booklets*, P. M. Bland and W. U. Dalby (Oliver & Boyd).

Reading Age

8+ *Happy Venture Readers*, Book IV.
Wide Range Readers, Books III and IV.
New Vista Readers, Book II.
Pathfinder, Book II.
Escalator Reading Booklets, Grade A.

9+ *Wide Range Readers*, Book V.
Read, Laugh and Learn, Book I (Grant Educational Co.).
Active Readers (Ginn & Co.).
Escalator Reading Booklets, Grade A.

The Wide Range Readers (F. Schonell and P. Flowerdew) have been especially planned to cater for the wide range in reading attainments of pupils between the ages of 7 and 11. These books are graded by control of vocabulary and sentence structure, *according to reading age*, and are in two parallel series, each of six books. Books I to IV are graded by half-yearly reading ages and hence allow of their use with sections or groups of pupils within each class. The scheme is as follows :—

Blue Book I and Green Book I.	Reading age 7 - 7½
Blue Book II and Green Book II.	Reading age 7½- 8
Blue Book III and Green Book III.	Reading age 8 - 8½
Blue Book IV and Green Book IV.	Reading age 8½- 9
Blue Book V and Green Book V.	Reading age 9 -10
Blue Book VI and Green Book VI.	Reading age 10 -11+

Books I to IV, both series, will be found to be of particular value with backward readers between the ages of 7 and 12+.

ARITHMETIC

Arith. Age

6+ *My First Book of Sums*, E. G. Hume and E. C. Wheeler (Evans Bros.).
The Child's First Number Book, P. B. Ballard (University of London Press).
The Child's Second Number Book, P. B. Ballard (University of London Press).
Arithmetic Practice Cards, Set A, F. J. Schonell (Oliver & Boyd).
The above for backward juniors only.

All pupils very backward in arithmetic should be given concrete material (a box of a hundred counters) with which to make their calculations. At this stage also we should provide cardboard coins for use in connection with the class shop.

Arith. Age

7+ *My Second Book of Sums* (Evans Bros.).
Arithmetic Practice Cards, Set A and Set B (Oliver & Boyd).
Concrete Counting Material.
Right from the Start Arithmetic, Book I, F. J. Schonell and S. H. Cracknell (Oliver & Boyd).

Use a class shop for simple money problems.

8+ *Arithmetic Practice Cards*, Set A and Set B.
Right from the Start Arithmetic, Book I.
9+ *Right from the Start Arithmetic*, Book II.
10+ *Right from the Start Arithmetic*, Book II and parts of Book III.

SPELLING

The Essential Spelling List, F. J. Schonell (Macmillan & Co.).
6+ First pages of Group 1. } 396 everyday words.
7+ Group 1. }
8+ Group 2. 456 everyday words.
9+ Group 3. 544 everyday words.
10+ Group 4. 576 everyday words.

In so far as these everyday words are graded according to age usage and grouped according to structural similarity the backward pupil, in fact every pupil, obtains through studying them a useful supplementary course in word or phonic structure. Work with groups of 3, 4 or 5 words of similar auditory pattern contribute towards the pupils recognition of words. Moreover in this way reading, spelling and writing are linked together to produce more effective learning.

Periodic revision or help with these lists may be given from the graded dictations in *Essentials in Teaching and Testing Spelling*, pages 75-96. F. J. Schonell. (Macmillan & Co.).

ENGLISH

6+ Cards based on Exercises in *Backwardness in the Basic Subjects*, F. J. Schonell, pp. 450-453 (Oliver & Boyd).
7+ *Pathfinder*, Book I, J. and P. Bradley (Oliver & Boyd).
Cards based on Exercises in *Backwardness in the Basic Subjects*, pp. 454-456.
Composition Through Pictures, Book I, Craddock (Elkin Matthews).
8+ *Pathfinder*, Book II.
Cards based on Exercises in *Backwardness in the Basic Subjects*, pp. 456-463.
Composition Through Pictures, Book II.
9+ *Pathfinder*, Book III (in preparation).
Direct English, I. M. Lewis and A. H. Stewart (Ginn & Co.).

X. SHORT LIST OF BOOKS ON TESTING AND REMEDIAL METHODS

AS we have indicated in earlier sections it is important that those engaged in testing should be fully conversant with all aspects of the use and interpretation of tests [1]—a knowledge which is accumulated through both theoretical considerations and practical experience. Successful testing depends on adequate information derived from both sources. Thus those who use tests without some idea of the principles of their construction may be limited in what they can obtain from examination of the qualitative aspects of the test results, particularly the testee's errors. For this reason we have provided a short list of selected books on testing and remedial methods, with brief indication of their particular values.

I. Testing

The New Examiner. P. B. Ballard (University of London Press).
See also "New Norms for Ballard Reading and Arithmetic Tests for Seven Year Olds." G. H. Thomson and D. M. Lawley. *British Journal of Educational Psychology*, February 1942.

Group Tests of Intelligence. P. B. Ballard (University of London Press).

Mental and Scholastic Tests. C. Burt (Staples Press).
Contains a most useful battery of scholastic tests in reading, spelling, arithmetic, drawing and composition, which are reprinted separately in *Handbook of Tests* (Staples Press).

A Guide to Mental Testing. R. Cattell (University of London Press). A very useful survey of all kinds of tests, but not completely up to date in respect to British tests published during the last ten years.

Essentials in Psychological Testing. L. J. Cronbach (Harper Brothers).

Performance Tests of Intelligence. J. Drever and M. Collins (Oliver and Boyd).
Contains battery of performance tests with standardisation.

The Use and Interpretation of High School Tests. H. A. Green and A. N. Jorgenson (Longmans).

The Testing of Intelligence. H. A. Hamley *et al.* (Evans Brothers).
This reprint from the *Year Book of Education* has useful sections on

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[1] A working list of intelligence, attainment and diagnostic tests is given in *Backwardness in the Basic Subjects*, Appendix IV., pp. 544-52, F. J. Schonell. (Oliver & Boyd).

tests of intelligence, attainments, æsthetics, temperament and character, by various authors.

Backwardness in the Basic Subjects. Fourth Revised Edition. F. J. Schonell (Oliver and Boyd).
Contains information on testing of reading, spelling and intelligence from both the diagnostic and attainment aspects.

Diagnosis of Individual Difficulties in Arithmetic. F. J. Schonell (Oliver and Boyd).
Gives in detail information on the use and interpretation of twelve diagnostic tests in arithmetic.

Measuring Intelligence. Lewis M. Terman and Maud A. Merrill (Harrap).
Contains much useful information on the construction and standardisation of the Revised Stanford Binet Scale.

Intelligence Tests for Children. C. W. Valentine (Methuen and Co.).

The Measurement of Mental Abilities. P. E. Vernon (University of London Press).
This deals fully with the nature and principles of tests and testing, particularly in relation to classroom needs and to the treatment and interpretation of test results.

The Standardisation of a Graded Word Reading Test. P. E. Vernon. Scottish Educational Research Council Publication (University of London Press).
A short useful manual dealing with the construction of a graded word test. Contains a new reading test and a revision (for Scotland) of Burt's graded word test.

Language and Mental Development of Children. A. F. Watts (Harrap).
Contains suggestive reading and English tests.

II. Remedial Methods and Materials

"The Remedial Treatment of Reading Disability." L. B. Birch. *Educational Review*, Vol. I, No. 2 (Oliver and Boyd).
Describes the establishment of a reading centre in a county borough and outlines the steps taken to teach backward pupils to read and spell.

Play in the Infant School. E. R. Boyce (Methuen).

Activity in the Infants' School. M. E. Daniel (Basil Blackwell).
Both these books describe methods and materials that can be effectively used with children who require a period of expressional play before actual remedial methods are commenced.

The Education of the Ordinary Child. J. Duncan (Nelson).
An account of methods used at the Lankhills Special Residential School for E.S.N. children.

The Education of Backward Children. E. Kennedy Fraser (University of London Press).

Cumulative Record Cards—Notes on their Content and Use. C. M. Fleming (University of London Press).

The Improvement of Reading. A. I. Gates. Third Edition 1947 (The Macmillan Company, New York).

This provides excellent suggestions for remedial reading exercises for weakness in word and phrase recognition and in comprehension.

The Educational Guidance of the School Child. H. A. Hamley, R. A. C. Oliver, H. E. Field, Susan Isaacs (Evans Brothers).

Suggestions in Child Study and Guidance embodying a scheme of pupil's record cards.

The Young School Failure. M. Highfield (Oliver and Boyd).

An account of work with backward pupils in which play therapy and increased understanding between home and school were major factors in remedial work.

The Education of Backward Children. M. Hill (Harrap).

Child Treatment and the Therapy of Play. L. Jackson and K. M. Todd (Kegan Paul).

This is a very helpful book on the diagnostic and therapeutic value of play.

Play Therapy in Childhood. C. H. Rogerson (Oxford University Press).

Learning to Read. David Russell (The Macmillan Company).

Includes very sound chapters on remedial methods and materials of particular value to teachers in primary schools.

Remedial Aids through the Grades. D. Russell (The Macmillan Company).

The various remedial devices suitable for backward readers at each age level from 7 to 14 are set out in detail. From these teachers could construct additional remedial material.

Psychology and Teaching of Reading. F. J. Schonell. Third Edition (Oliver and Boyd).

Various methods of teaching reading are examined with specific reference to organisation for backward readers in junior schools. An appendix provides sample remedial exercises for various weaknesses in reading. Sets of some of these graded exercises, particularly those relating to the matching of words, phrases and sentences to pictures, construction of sentences without pictures, simple exercises and puzzles to test comprehension, all based on the material in the *Happy Venture Readers* (Oliver and Boyd) are now available.

See *Happy Venture Reading Material* (Oliver and Boyd). Envelope of material for Introductory book, price 3s.; material for Book I, price 2s. 6d.; material for Book II, price 1s. 9d.; material for Book III, price 1s. 6d.; material for Book IV, price 1s. 6d.

"The University of Birmingham Remedial Education Centre." F. J. Schonell and W. D. Wall. *Educational Review*, Vol. II, No. 1 (Oliver and Boyd).

Describes some of the methods and materials used with intelligent backward pupils seen at the University Remedial Education Centre. Of particular interest is the small experiment with home coaching groups of backward pupils.

Articles on "The Development of Educational Research in Great Britain." Parts V, VI, VII. "Handicapped Children." *British Journal of Educational Psychology*, June 1949, November 1949, February 1950. F. J. Schonell.

These and earlier articles include many references to testing and teaching methods with both normal and handicapped pupils.

Experiments with a Backward Class. E. Taylor (Methuen).

Describes methods used successfully with very backward children. The remedial methods that centred around letter writing are of particular interest.

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